The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE;

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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CLAUSTHAL MINING SCHOOL NOTES.—No. CXII.*

BY J. CLARK JEFFERSON, A.R.S.M., WH. SC.,

Mining Engineer, Wakefield.

(Formerly Student at the Royal Bergakademie, Clausthal).

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SECTION V.

The largest example of this mode of shaft sinking is that of the shafts at the Rheinpreussen Colliery, near Ruhrort,† which is a somewhat exceptionable example, inasmuch as here two sinking wall linings are inserted, the one within the other; which are followed at a greater depth by two sinking linings of cast-iron. The first walling is 74 ft. deep, 24 ft. 8 in. inside diameter, and 29 ft. 8 in. in exterior diameter. The second at a depth of 245 ft. is 15 ft. inside diameter, and 20 ft. 6 in. outside diameter. The first cast-iron lining is 13 ft. 8 in. inside diameter, and at the end of the year 1861 had reached a depth of 305 ft., when a second cast-iron lining was inserted within the last; but up to the summer of 1868, which found the workmen employed in recovering and removing broken pieces of the cast-iron lining, a depth of 358 ft. only had then been attained.

The sack borer had originally a width of 14 ft. 8 in., and was actuated by an 18 horse-power steam-engine, the shaft rods of the sack borer being 4¼ in. square in section. The footing of the first sinking walling consisted of 6 cribs of 4 in. beech planks, and a shoe formed in 16 segments; the metal being 1½ in. thick, the height of the shoe 21 in., and the breadth 17 in. The breadth of the cribs increases upwards, so that the inner diameter of each is 5 in. less than that of the next below: this gives 32 in. as the breadth of the uppermost crib on which the walling is built. A layer of well tarred pasteboard is placed between each crib. The inside of the shoe is closed with planks, which are held in place by means of iron hoops. The thickness of the wall, which where it rested on the footing amounted to 32 in., decreased ¼ in. per 10 ft. upwards. The suspension rods were 1⅜ in. square, and connected with screws 4 in. long. Rectangular cast-iron washers were built in the wall immediately above and below the joint. For excavating the ground a four-winged sack borer was used. When sinking of this first lining could not be carried any further downwards, the attempt was made with cast-iron sinking linings. These failing, resort was had to the insertion of a second sinking lining of brickwork within the first. The shoe of this second lining was composed of two rings, formed each of eight segments; the total height of the shoe being 5 ft. 6 in., and the breadth of the top of the shoe (the upper crib) 34½ in. The metal of the shoe was 2 in. thick; the joints of the segments alternated in the two cribs, and were made tight by inserting ½-in. willow planking. The hollow space of the lower ring is filled with 4-in. beech planking; that of the upper ring is filled at the back with brickwork, and at the front with 8 in. of 4-in. beech planking, which forms a continuous conical surface with the filling of the lower ring. The bed for the walling consists of eight rings, or cribs, of 4-in. beech planks, giving a total thickness of 2 ft. 8 in. for the bed This wall decreases in exterior diameter 1 in. per 10 ft. upwards. The vertical suspension rods consisted of 1⅜ in. square iron rods, the horizontal tie rods being composed of flat bar-iron. The working scaffold used for this second lining of brickwork was built in the first lining. For preserving a vertical descent of this second walling, a set of four guides, or conductors, formed of long (28 ft.) beams of pine were suspended from the scaffolding. The inner sides of these conductors were covered with sheet-iron, and strutted at the back against wedges, which could be driven up, causing the guides to approach each other as the walling sunk (the latter becoming gradually less in diameter). The borer, which made one rotation per ¾ minute was driven by a high pressure 14 in. cylinder steam-engine, making from 90 to 100 strokes per minute. For raising and lowering the rods a 140 h.p. steam-engine, which was at first intended for pumping purposes, was used. The cylinder was of 40 in. diameter, the conical drum 4 ft. 10 in. mean diameter, and the iron wire rope 3½ in. diameter. The transmission from the engine to the boring machine was by means of belting on to a pulley fixed on to a horizontal spindle. By means of bevil gearing a vertical axle is driven from this horizontal axle. A long pinion on this vertical axle gears into a toothed wheal, fixed to a second vertical axle, placed immediately over the centre of the shaft, being connected with the boring rods. This vertical axle rotates in a couple of bearings fixed on two carriages running on rails, so that the large toothed wheel and axle (when the latter is disconnected from the boring rods) can be moved sideways from over the mouth of the shaft, leaving it free for raising the boring rods and the sack borer. The boring rods during the time the borer is at work must be suspended, so that the boring tool does not penetrate the ground too much. The rods are suspended by means of a capstan, and can, therefore, even during the working be raised or lowered a few inches, as is advisable. The boring rods were formed at first of 4 in. and afterwards of 4½ in. square iron rods, with bevelled edges. The separate rods were 16 yards long, and weighed from 31½ to 34½ cwts. Besides, shorter rods of 7, 4½, and 2¼ yards in length were used as lengthening rods. The joints of the rods were made of taper pins (square in section), which fitted into corresponding sockets, and were made fast with split cotters. Beside the swellings from the joints three collars are forged on each separate rod. A double winged sack borer of 14 ft. 8 in. diameter was employed for excavating the ground. The sack consisted of sailcloth in the upper part, and of leather in the lower portion, besides being strengthened generally by cross strips of leather. The sack was attached to the borer at the upper end by means of hooks and eyes, and at the lower by being nipped up tight between two flat pieces of iron, held together by means of bolts and nuts.

The natural water level was retained during the whole of the boring operations (when necessary for the purpose water was poured into the thaft), in order to prevent any movement of the strata on the outside of the lining. The depth of 75 metres was successfully reached, when a further lowering of the lining could not be effected. The attempt to force the lining down was then made with eight screw and two hydraulic presses, but in vain. This was followed by the attempt to pump out the water, with the result of causing the ground to break through. In consequence of this the shaft was filled to a height of 40 ft. with lime and clay, and the sinking was again commenced with a cast-iron lining. The rings were composed of eight segments, 3 ft. in height. The inner diameter was 13 ft. 8 in., and the outside diameter 14 ft. 6 in., which left a space of 3 in. between the iron lining and the brick lining. The rings forming the cast-iron lining were built up on a cast-iron shoe, 21 in. high, the segments of which were strengthened with seven ribs, beside the end ribs or flanges. The vertical side of the shoe projected 1½ in. beyond the other rings. The segments of the iron lining were strengthened by one horizontal and three vertical ribs. The thickness of the metal of the shoe and the lower rings was 2 in., that of the upper rings 1½ in. The horizontal and vertical joints are made tight by inserting ½-in. planks of willow, the joints being afterwards wedged. During the building of the iron lining the water was allowed to rise to its old level in the shaft, and the sand and clay which had been filled in were excavated by means of the sack borer, with the effect of lowering the iron lining 10 ft. below the foot of the second brick lining, when strong ground opposed the further sinking of the lining. In order to drive through this ground the water was again pumped out of the shaft, with results of again setting the ground in motion and breaking through the bottom of the shaft, when recourse must again be had to the use of the sack borer, which bringing up several fragments of the iron segments indicated conclusively that the shoe of the iron lining had been broken. The attempt was made to see how much further the iron lining could be sunk in this condition, but with little success, so that this attempt had to be abandoned, with the intention of sinking a second iron lining.

The removal of the fractured pieces occasioned the greatest difficulties, compressed air being used during part of the time to dam back the water; but its use after the bursting of the air pipes was abandoned. By these operations, however, sufficient free space had been obtained to fill up the bottom of the shaft with beton, and to commence building the second iron lining, which on boring through the beton sank till its further descent was opposed by still unrecovered broken fragments of the former iron lining, which caused the shaft to deviate from the vertical. The lining had, therefore, to be hung from iron suspension rods, and with this precaution an apparently firm and compact marl was reached at a depth of 320 ft.; on sinking 20 yds. further (at a depth of 340 ft.) running ground was again met with. Whilst the lining was being lowered through the compact ground one of the suspension rods broke, so that the iron lining fell a depth of 54 ft., fracturing the lining to a height of 19 ft. above the shoe. As the lining still showed a tendency to sink it was attached to 40 1½ in. suspension rods, and the excavation of the ground was again commenced. First, in November, 1868, the bottom of the shaft had been lowered to 370 ft. in depth, and was so far cleared of iron that with the use of a smaller borer the upper surface of the coal measures was reached at a depth of 420 ft. The shaft was then tested, and found perfectly round and perpendicular, and in good order up to a depth of 308 ft.; from thence the diameter of the shaft diminished to 3·6 metres, whilst still lower down portions were found broken out of the shaft lining. A sheet-iron cylinder, 1 in. thick, 3·57 metres in diameter, and 19 yards in height, was then lowered by means of a windlass to the bottom of the shaft, and sunk to a bed of clay at a depth of 386 ft. The bed of clay was then bored through, and the boring carried to a depth of 4·55 metres in compact rock, where the diameter was enlarged, the space filled up with trass-mortar, and the attempt made to sink the sheet-iron cylinder. In consequence of the cylinder setting fast in the mortar it could not be lowered, and the mortar had to be bored out again as far as the foot of the cylinder; the excavation in the clay bed was enlarged to a diameter of 4·55 metres, and the space filled up with concrete made of the best materials. It was hoped that the core of concrete could be widened to a diameter of 3·6 metres, which would leave a concrete lining ·47 metre in thickness for the support of the sides of the excavation. The shaft was, therefore, filled up to a depth of 95½ metres (*i.e.*, 4 ft. above where the diminution of the diameter of the shaft began) with concrete, which was completed at the end of 1869. It was expected that the boring under water was now completed, and the boring apparatus was removed, and arrangements made for continuing the sinking in the ordinary manner with the winding bucket. After the concrete had hardened that portion of the 12-ft. iron lining within the 15-ft. iron lining was removed, and the opening between the two linings secured. The hardened cement in the remaining main portion of the 12-ft. lining was then carefully cut away, when three large cracks were discovered in the lining, through which the quicksand poured with great force.

Simultaneous with the cutting away of the concrete a cast-iron lining (built in segments) 3·40 metres in diameter was lowered and carried down to the upper end of the sheet-iron cylinder, and joined water-tight with it. The space between this cast-iron lining and the 12-ft. lining was filled with cement concrete. Simultaneous with the excavation of the concrete within the sheet-iron lining, a narrower (3·35 metres in diameter) cast-iron lining was lowered, the metal of the lining being ¾ in. thick. The work then proceeded successfully to a depth of 380 ft., which was reached at the beginning of July, 1870, when unfortunately a portion of the shaft lining broke through where the two iron linings were cemented together with concrete, and in a short space of time the shaft was filled to a height of 100 ft. with quicksand. Recourse must, therefore, again be had to sack boring, which at the time this account was written by Lottner was still being continued. The shaft had then been sunk to a depth of 380 ft., with a diameter of 3·14 metres, in to a further depth of 16 ft., 1 metre in diameter, where solid compact rock had been met with; there lay so many broken fragments of shaft lining at the depth of 380 ft. that the difficulties could not be expected to be surmounted for some time. Similar difficulties and misfortunes were met with in sinking the second shaft at a distance of 42 metres from the first, but enough has been given to show the difficulties which are met with in sinking through strata containing running sand, &c., which, fortunately for English miners, is a somewhat rare occurrence.

* Being Notes on a Course of Lectures on Mining, delivered by Herr Bergrath Dr. VON GRODDECK, Director of the Royal Bergakademie, Clausthal, The Harz, North Germany.

† Lottner-Serb., "Manual of Mining," p. 568.

SOUTH STAFFORDSHIRE AND EAST WORCESTERSHIRE INSTITUTE OF MINING ENGINEERS.

A general meeting of members was held at the Geological Museum, Dudley, on Monday, Mr. HENRY JOHNSON, sen. (President), in the chair. It was shown from the minutes that a large room had been taken by the Institute for the formation of a Mining Museum in conjunction with the present Geological one. The following gentlemen were elected members of the Institute:—Messrs. T. H. Bailey, David Bickley, Thomas Price, Thomas Bateman, and W. Hardy.

The PRESIDENT then read the following paper:—

ON THE RAISING AND LOWERING OF MINERS IN COLLIERIES.

It is not until recently that I have become acquainted with the great difference there exists throughout the different mining districts of Great Britain in the number and conditions under which miners are raised and lowered to their work under the existing Mines Regulation Act. You are all doubtless aware that the Home Secretary has the power to sanction an increase in the number on application according to the circumstances which can be shown call for such increase. In this district, as you are aware, the number is eight persons at one time, and the opposite band or cage must come up empty, and one object of this paper is to show the fallacy of the latter restriction, especially in deep pits. A short time ago I had occasion to ask the Home Secretary to permit me to increase the number by eight, but altimately he sanctioned twelve to be raised and lowered at one time. In consequence of the men taking some temporary objection to so great a number being lifted at one time, I made enquiries of the practices in such case from every mining district in Great Britain. In order to have the information as authentic as possible I applied to the whole of Her Majesty's Government Inspectors, who in the kindest and most prompt manner afforded me the information, for which I take this opportunity of thanking them on behalf of this Institute. The result of that information, I think, will be interesting to you as showing the great difference, both in a scientific and economical sense, as compared with this and most other districts and the North of England, which latter district is acknowledged to be the pioneer in mining scientific knowledge in Great Britain. The following table will show at a glance the great difference there is in the practice of the several districts:—

	Persons.	
1.—North and South Staffordshire ...	8	if mixed with boys, 12
2.—Scotland	8	
3.—Yorkshire	10	
4.—Glasgow (south-west division)	4	in one cage.
	8	in two decks not to ride with tubs.
5.—Lancashire	10	
6.—Forest of Dean	10	
7.—Derbyshire	12	
8.—South Wales	16	
9.—Durham	24	double-decked cage, carrying two tubs, or 28 boys.
10.—Monkwearmouth	18	men or 24 boys, four decks, carrying two tubs each.

At the latter place, when the full complement of men are descending, they are placed in empty tubs, and eight full tubs are raised with the other rope, and when the men are ascending four full tubs are lowered with the other rope. The men ride in the empty tubs both in ascending and descending. It will be seen by the above table that the number of men riding at one time ranges between 8 and 24, and the greater the depth the greater the number of men carried at one time; but the greatest anomaly exists in one district being permitted to carry only 8, and restricted from riding with or in an empty tub, while another district compels the men to ride inside the empty tub, and descend and ascend against the opposite load. Strange as this may appear at first sight, I contend that it is both safer and more economical to raise and lower the men against the load or part of the load in deep mines pits. The engineman can handle his engines far easier and safer when both bands are equalised. Where a great number of men have to be raised and lowered night and morning, the time occupied in doing it (with safety) has become a serious item. In my opinion, in all deep and important collieries, to raise and lower men against an empty band is both unscientific as regards the safety of the men, and wasteful as regards the conduct of a colliery.

A discussion took place, but was eventually adjourned so that the paper might be printed and circulated.——A vote of thanks was unanimously accorded Mr. Johnson for his paper.

ENCOURAGEMENT OF SCIENCE STUDIES.

TRINITY COLLEGE, LONDON.

The progress made during the past quarter of a century in providing increased facilities for the attainment of scientific knowledge without passing through a complete course of study at a university has been enormous; but, although non-collegiate students have been offered some opportunities for presenting themselves for examination and for gaining certificates indicating the amount of proficiency attained, these offers have in most cases been in a form which rendered them scarcely acceptable to those to whom they were made. Either the certificates were granted as a kind of favour rather than as a distinction to which the candidate by his successful labour and perseverance had entitled himself as a right, or it was granted by an examining body, the academic rank of which was not so universally recognised as to give the certificate such an undoubted value as to make it worth working for. It was the changing of this feeling among students that formed one of the primary objects of the Council of Trinity College, London, and, judging from the success which has attended their exertions during the few years which have elapsed since the college was instituted, the principle adopted appears to have given very general satisfaction. The calendar for the current session shows that there are at present, in connection with the local examination, no less than 11,362 students on the roll of the college; and that whilst at the first annual examination 1118 candidates were entered, of whom 625 were classed and passed, there were entered for the second annual examination in June, 1878, no less than 1667 candidates, of whom 404 entered in the senior division, and 1263 in the junior division. The honour list of the senior division included 12 first, 56 second, and 70 third classes, and there were 139 passes, making 277 in all. The honour list of the junior division included 10 first, 56 second, and 100 third classes, and there were 713 passes, making 879 in all. Taking both classes together rather more than two-thirds of the candidates were successful. These figures are highly satisfactory, since they show that, although the certificates of the college are not granted indiscriminately, students who have studied diligently under good teachers may look forward with confidence to at least a pass upon going up for examination.

The college has been regularly incorporated by a special charter, and the honorary presidency is held by Lord Selborne, whilst the names of Canon Duckworth, the Master of the Temple, Mr. J. Cowen, M.P., Mr. W. H. Gladstone, M.P., the Hon. R. E. S. Plunkett, M.P., and others appear on the list of vice-presidents. The government and property of the corporation are vested in a council of twenty persons, the Rev. H. G. Bonavia Hunt being the warden, and Mr. Frederic Clark the organising secretary. The marvellous success which has attended the college from its inception may probably be attributed to the circumstance that it was originally designed for the advancement of Church music and the improvement of Church musicians as a class, and that, consequently, it at once received the warm support of clergymen of position and influence throughout England. The musical instruction given by the professors and teachers connected with the college was of a high class, and the diplomas of the corporation were speedily accepted as conclusive evidence of musical ability. Now, it will be obvious that to have permitted diplomas of this character to fall into the hands of persons entirely deficient in those branches of general knowledge which are usually expected to be possessed by gentlemen would have been very undesirable, since it would have lessened the honour attaching to the diploma itself, and would have been very prejudicial to the college. It was, therefore, determined to place the institution upon a wider basis, and to enable sound general and musical education to be acquired simultaneously. The academical division is under the superintendence of a board of graduates deputed by the general council, and the utmost liberality has been shown in the arrangements which have been made in the interest of students. The teaching staff at present numbers 29 professors and lecturers, and, as most of the members of the council can claim considerable academic experience, there is an ample guarantee that none but able and energetic men would be appointed to teach. At present Trinity College, London, is not alone the only institution in England which provides special and complete training for choirmasters; but it has organised a system of teaching throughout the country by which students are cheaply and efficiently prepared for the public examinations of the college, for university degrees, and for the musical and other professions.

Trinity College, London, is essentially a Church of England establishment; but its examinations are thrown open to all, whether students of the college or not, and without restriction of creed, whilst the fees payable are little more than nominal. The diplomas of Associate in Music and Licentiate in Music respectively are granted under conditions which will secure their honourable recognition everywhere, and to make the college as extensively useful as possible it has recently been determined to grant also the certificate of Matriculated Student in Arts (which is open to candidates of both sexes above 14 years of age), and the diplomas of Associate in Arts, and Licentiate in Arts, the first examinations for which are to be held on July 16 and following days, both in the college building and at the various centres throughout the kingdom. The Dean of the Faculty of Arts is Prof. W. J. Jennings, B.A., Cantab., and the regulations for the examinations therein are framed upon extremely liberal principles.

The matriculant is required to show competency in English, arithmetic, geography, and English history, elementary Latin, German or French, and elementary music, only two of the three last subjects need be taken, so that the views of all classes of students can be readily met. For the Associateship in Arts the examination is slightly above that for matriculation at London; whilst for the Licentiateship the candidate must possess rather more knowledge than is required for the London First B.A.; but the distinguishing feature of the Trinity College curriculum is that in each of the Arts grades Musical Knowledge is duly recognised as an element of general culture; thus for the Associate in Arts either elementary acoustics or elementary musical theory (formation of scales, triads, dominant chords, &c.) must be taken; and for the Licentiate in Arts the candidate must satisfy the examiners either in those branches of natural philosophy bearing more directly on music (acoustics, with more immediate application to musical tones and physical optics) or in the theory of music so far as to show a knowledge of the nature and principles of natural harmonics and temperament, to analyse chords, and to explain the general laws of harmony and the ancient Greek modes.

From the careful and thoughtful manner in which the several subjects of examination are arranged the course of study demanded seems likely to prove of great utility to those intending to matriculate and graduate at the University of London, since the subjects taught in most instances closely correspond, and the passing of the Trinity College examinations will, by accustoming the student to the work which has to be gone through before the University examiners, give him a vastly improved prospect of success. As the candidates for the several diplomas can present themselves for examination within a few miles of their own homes, the cost of doing so is reduced to the minimum, whilst the fees are such as to place the diplomas within the reach of all whose studies and acquirements entitle them

to such distinction. The honours offered by Trinity College, London, will certainly be appreciated by a large number of students.

SECONDARY TECHNICAL EDUCATION.

There is probably no question bearing upon social welfare and progress which is so difficult of solution as the question of the conciliation of capital and labour, but the first step towards that solution is the establishment of the fact amongst both masters and workmen that the motto most to the interest of all concerned is not "liberty, equality, fraternity," but "liberty, prosperity, fraternity." This view has evidently been taken by Mr. ECKLEY B. COXE, the President of the American Institute of Mining Engineers, in his address on Secondary Technical Education, delivered at the recent meeting at Baltimore. He mentions that a former president—Mr. A. L. Holley—directed the attention of the American Institute of Mining Engineers, and the American Society of Civil Engineers, and that the problem to the solution of which the meeting devoted its attention was—"Shall the practical education of the engineer in the mine, in the rolling mill, in the workshop, or in the field precede, be contemporaneous with, or follow his theoretical studies in the technical school?" Mr. Coxe now asks attention to another question in technical education equally worthy of consideration, but which has hitherto attracted little attention in America—"Shall the apprentices (he calls them so for want of a better general name) who are growing up and learning their trade in and around the mines and works, and from whose ranks the master mechanics and foremen of the future must be taken—shall they be provided with some means of obtaining as much theoretical training as may be necessary to enable them properly to understand the various processes and operations that they may be called upon to superintend, and not be obliged to pick up as best they may here a little and there a little truth mingled with much error?" The question is one which cannot be too seriously discussed.

It should, perhaps, be mentioned that in the United States the system of apprenticeship is not recognised, so that it is not only scientific knowledge but practical knowledge also which the young workman has to pick up as best he may, the result being that there are by far too many "jacks of all trades and masters of none" for the good of either employers or workmen. The employer has difficulty in obtaining a sufficient number of really first-class working mechanics and men who honestly devote their energies to acquire superior skill as working mechanics in a particular branch of industry are prejudiced by having to accept but little higher wages than the jack-of-all-trades men. The lawyer, the scientist, and all connected with the higher professions willingly submit to place themselves under masters to learn their professions, and the fact of a man having been for several years under Liebig to learn chemistry, or under Foster or Woodhouse to learn mining engineering, gives such a man a position even in America which one who has picked up his knowledge promiscuously can only hope for after years of struggle, yet in America it is regarded little less than as a disgrace to bind oneself apprentice to a good mechanic, and thus become a high-class workman. That the employer derives some advantage from the apprentice's labour during the last two years of a five or seven years' term, but the fact that this advantage is in proportion to the care which the employer has taken to teach the apprentice his trade quickly and well fully compensates the apprentice. In England the trade societies are most jealous of admitting any upon their rolls but those who have properly served an apprenticeship, and as a rule none but society men are worth employing.

At the works with which Mr. Coxe is connected they have determined to establish schools on the principle of the Steigerschulen of Germany, in which he says "there will be very little discipline of any kind, and every boy who strives to get on, even though he may not have great ability, will be encouraged and aided; those who show no inclination to work or who are disorderly will be dropped. The studies will be so arranged that each boy will always be able to work part time, and so gain practical experience, and wholly or partially support himself." The principle certainly contains nothing to complain of, and the progress made will be watched with much interest.

TECHNICAL EDUCATION IN NOVA SCOTIA.

The many advantages which would accrue to Nova Scotia from the systematic and scientific development of the great though comparatively neglected natural resources of the province have frequently been referred to in the *Mining Journal*, and it has been pointed out that nothing would tend more rapidly to bring about an improved state of things, and with it increased prosperity, than the extension of sound technical knowledge amongst those upon whom would properly devolve—the Nova Scotians themselves—the control of any commercial enterprises which might be inaugurated either by Canadian or by English capitalists. The high character of the scientific instruction offered at King's College, Windsor, has already been mentioned, and it is gratifying to find that the University of Halifax has adopted the same high standard in fixing the examinations for the degrees in Science which it proposes to confer. At the time when the establishment of the University of Halifax was under discussion the *Mining Journal* did not hesitate to express the conviction that, especially in a colonial province, a teaching university was preferable to a paper university, or one which examines for degrees, but does not teach. Nothing whatever has occurred to alter this opinion, but it must be admitted that Nova Scotia was in an exceptional position, which, assuming a metropolitan university for the entire province to be desirable—and from the fact that the multiplication of colleges had to some extent justified the saying that academical degrees were more easily obtainable in the province than academical instruction, this metropolitan university certainly seems to have been quite necessary—rendered the establishment of an institution on the model of the University of London the only step practicable or likely to prove successful. It may here be suggested that the University of Halifax should still further imitate its prototype by adopting the London costume and colours in preference to any piebald system of braiding or edging such as is used in certain Canadian universities in order to keep the Oxford colours, and yet distinguish their graduates from those of King's College, Windsor, where those colours have been retained from its establishment by Oxford men now 90 years ago.

In colonies wherein no corporations possessing the power to confer degrees existed there was comparatively little difficulty in framing a legislative Act for establishing a university acceptable to all classes of the community; but in Nova Scotia there were several degree-conferring bodies besides the original University of King's College at Windsor, and these had each their teaching staff and curricula arranged of special characters. As the oldest, the Church of England —King's—had naturally the greatest influence, so that the Presbyterians, Catholics, Wesleyans, &c., very reasonably felt that in establishing a teaching university it would be difficult to ensure complete regard for their religious views, whilst a merely examining body could readily secure the great object in view—that of "raising the standard of higher education in the province, and of enabling all denominations and classes, including those persons whose circumstances preclude them from following a regular course of study in any of the existing colleges or universities to obtain academical degrees." The University Act, 1876, was framed with the utmost liberality, for it declares, amongst other things, that the graduates of King's College, Windsor, Acadia College, Wolfville, Dalhousie, St. Mary's, and the Medical Colleges, Halifax, St. Francis Xavier's College, Antigonishe, and Mount Allison Wesleyan College at Sackville, shall be graduates in the newly-incorporated University of Halifax. Vested interests were thus completely protected, and it cannot be doubted that it would be to the advantage of every graduate of any of the colleges mentioned to take the earliest opportunity of exercising his right to claim a place on the register of the University of Halifax. The time has been extended by a supplementary Act to prevent the exclusion of any who desire to register; and all should remember that the University promises to be a great success, in which case absence from the register would be annoying, whilst in the improbable contingency of failure hereafter the loss cannot exceed a few dollars.

With regard to the Science degrees—those of B.Sc. and D.Sc.—which the University of Halifax proposes to confer, it has already been mentioned that the standard has been fixed quite high enough to prevent any but really competent candidates from securing the diplomas. The degree of B.Sc. is only obtainable, as at London, by those who satisfy the examiners at two distinct examinations. The first embraces—in mathematics: algebra, Euclid, analytical geometry, and plane trigonometry—in physics: statics, kinetics, properties of matter, and various forms of energy—in chemistry: a knowledge of the general principles of the science, a sound knowledge of inorganic chemistry, and an elementary knowledge of organic chemistry—in the natural history department: botany, zoology, or geology—and in modern languages: French or German. It need scarcely be said that to successfully undergo this test the candidate must really possess a fair amount of general scientific knowledge, and he can thus safely be left to select one section of the series for the Second B.Sc. examination, so that he may devote ample attention to those subjects most likely to be useful to him in after life. The first section or department of mathematical science embraces pure mathematics, mathematical physics, and astronomy. The department of experimental physical science includes physics and chemistry. The requirements in the department of biological science can be best judged of from the text-books recommended; these are Balfour's Class Book or Sach's Botany, Gray's Manual or Abbé Provancher's Flore Canadienne. Nicholson's Zoology, Agassiz's and Gould's Comparative Physiology, and Dewar's Organic Chemistry. And the department of mining includes practical chemistry, mineralogy, applied mechanics, mechanical drawing, geology, and mining.

The examiners appear to have been chosen with considerable judgment—the list embracing the most competent professors connected with King's and the other affiliated colleges. The advantage of this is obvious; they are well acquainted with the exact requirements of the province, and with the system of teaching that has been pursued, so that they can thoroughly test the proficiency of the candidates without falling into the too common error of putting questions to them which can scarcely be successfully prepared for without a large amount of cramming. The examination papers already set, and which are appended to the Calendar, are worthy of the University, and will be accepted without hesitation as evidence of the ability of those who have obtained their academic rank by answering them. The list of graduates, according to the Calendar, is at present very small, from the apparently curious circumstance that the gentlemen forming the Convocation, and representing the several faculties, are not classed as graduates of the University of Halifax, although they are almost without exception graduates of the affiliated colleges, and, therefore, entitled by sec. 3 of the Act to registration. If the neglect to register be due to any feelings of jealousy on the part of the gentlemen themselves it may safely be said that such feelings are unjustifiable, and unlikely to be of advantage to them, and if it be due to any restrictions on the part of the University those restrictions should be at once removed. The system which the University of Halifax represents is at present on its trial in Nova Scotia, if it succeed it will be to the permanent elevation of collegiate education in the province, so that no obstacles should be placed in the way of its success, especially by those whose privileges have been so well cared for. It is to be hoped that by the time the next Calendar is printed the names of the graduates of all the affiliated colleges will appear in one list with those now placed there as graduates of the University of Halifax.

THE MARBLE MOUNTAIN OF CAPE BRETON.

The valuable marbles discovered by Mr. N. J. Brown on the north side of the West Bay of Bras d'Or Lake in September, 1868, have since been successfully developed, and have yielded fair remunerative results to the proprietors, and now a revised tariff is about to be established for the Dominion of Canada it is confidently believed it will assume a condition of prosperity which will tend to cause increased attention to be directed to the vast mineral resources which are now lying idle. The Cape Breton Marble Company, by which the marbles in question are now worked, taking advantage of present prospects have issued a pamphlet containing reports and information with regard to their quarries which are of considerable interest. That the error of protection and reciprocity will probably be discovered ere long both in the United States and in Canada cannot be doubted; and, perhaps, the system of retaliation now going on between the two countries will be the quickest means of making both nations comprehend the advantages of free trade. The Dominion Government seek to give the market of the Dominion to the coal deposits of Nova Scotia by levying a protective duty of 50 cents (2s.) per 18 cwts. upon anthracite coal, bituminous coal, and coke, forgetting that by this measure they place every industry in the Dominion using fuel at a disadvantage as compared with their rivals to the extent of that 2s. per 18 cwts. The same argument applies with equal force to marbles and stones—the protective duty will give the producer but little direct advantage, and this will be fully counteracted by the indirect disadvantage. The proposed duties are—On marble planks, rough on two sides, when not specially shapen, containing 15 cubic feet of front, 10 per cent.; planks and slabs sawn on more than two sides, 20 per cent.; on finished marble, mantles of marble, and imitation marble not elsewhere specified, 25 per cent. *ad valorem*; on stone, rough freestone, sandstone, iron plated stone, excepting marble, per ton of 13 cubic feet, $1; on curb stone in the rough, $1·50 per stone; water limestone, $1 per ton; on dressed freestone, building stone, and all manufactured stone, 20 per cent. *ad valorem*; slate for roofing, or slate slabs square and not specially shaped, 20 per cent. *ad valorem*; school and writing slate, 25 per cent.; slate mantels, (?) per cent.; bricks for building, 20 per cent.; fire-bricks or tiles for stoves and furnaces, 17½ per cent.; hydraulic or water lime ground, including barrels, 40 cents per barrel; ditto in bulk or boxes, 20 per cent. *ad valorem*; drain pipes and sewer pipes, closed or unclosed, 20 per cent. *ad valorem*.

But in this particular instance it is not so much a question of protection and free trade as a question of retaliation for the levying of a prohibitory duty by a neighbouring State. Under these circumstances the Canadian protective duty becomes an absolute necessity. The company points out that the American duty of $6·25 per ton prohibits the Marble Mountain products from entering their market, and virtually it affects no other producer. The removal of both the American and Canadian duties would be advantageous to both, but that the Marble Mountain produce should be deprived of both the Canadian and the United States sale appears unreasonable. From the reports which have been given of the property and of the produce there is no doubt that with a fair field and no favour the Marble Mountain quarries could readily hold their own, and as soon as the products become more generally known there will be a ready demand for all that can be wrought. The property has been several times reported upon by Prof. How, D.C.L., of King's College, Windsor, N. S., and from his reports it appears that the grants are for periods of from 100 to 999 years, and embrace an area about 9¼ miles long by 1½ mile from the water inward along the shore of the lake; about half of the property, or 3000 acres, has been proved to consist of marble, the mountain formed of it being about 700 ft. high. At the base of Marble Mountain is a large deposit of limestone of blue colour, which burns to a very good white lime; it gave on analysis —Carbonate of lime, 94·31; carbonate of magnesia, 0·75; oxide of iron and alumina, 0·45; water, 0·14; phosphoric acid, decided traces; and silicious residue, 4·35 = 100.

The most abundant and at present the most important marble by far is the white, and it is this which is being quarried; but the coloured varieties are found in considerable bands, and may doubtless be utilised if necessary. The different qualities of rocks may be classified as—1. Fine white statuary marble, East or Statuary Quarry.—2. Fine white building marble, Grand Quarry.—3. Coarse white building ice marble, Grand Quarry.—4. Blue and white clouded, or brocatello marble, at west end of Grand Quarry.—5. Brocatello marble is traced 600 yards west of Grand Quarry, in which distance it is mixed with some six varieties of coloured marbles—green and white, green, blue and white, red streaked with blue and white.—6. Fine flesh-coloured marble at the east end of Grand Quarry, and again east of the Statuary Quarry, where it changes to darker marbles, about 100 yards distant—blue and blue mixed with red; the last seen in this direction had rather deep red stains, mixed with green, and striped with nearly black lines. Hence it appears that abundant materials exist for varied inlaying and other applications of coloured marbles. Practical marble workers give a high opinion as to the quality and value of the marbles, and it is believed that with increased capital that which is at present a small and remunerative private enterprise might be extended into a lucrative industry, which would be alike beneficial to the capitalists engaged and to the entire Dominion.

THE ELECTRIC LIGHT—FLEXIBLE CARBONS.

One of the principal objections which have been made to the electric light, apart from its extreme costliness, is the unpleasant blue and non-diffusive light which is obtained; Mr. C. W HARRISON, of South Kensington, seeks to remove these objections. The improvements relate, firstly, to the preparation or construction of the electrodes or burners, the object being to produce a perfectly white and diffusive light. One method by which he effects this consists in impregnating or charging carbon burners with the metals or elementary bodies, or some of them, which exist in the solar spectrum, or its atmosphere combining those whose colours are complimentary; for example, sodium, giving a yellow light, and potasium, zinc, or mercury giving a bluish light, will in combination produce a white light. An easy method by which he carries this process into effect is to immerse the carbon burners in suitable solutions of the various metals or bodies and then dry them.—Other methods of making such burners may he remarks be adopted, as, for instance, the compounding together of different powders and uniting the same by pressure, heat, or otherwise; or different wires may be made up into ropes, or different fluids into streams, but, however, prepared or constructed these compound burners form a feature of his invention. The metals or bodies thus incorporated in the electrodes are given off in vapours during the combustion of the electrodes. These vapours he collects or deposits in the form of metals, either separately or in compound, by burning the electrodes under a glass shade hermetically sealed and kept filled by any suitable mean with chloride or other vapour, capable of combining with the vapours of the metals and thus depositing them.

The production of flexible carbons or flexible metallised carbon burners of any required thickness and length is also claimed by Mr. Harrison. This he effects by using threads or filaments of silk, cotton, or other suitable flexible material, which he first treats with acid, such as nitro-sulphuric acid, to render it more perfectly combustible, and then coats with carbon or metal by rubbing, pressure, or otherwise, incorporating with them powdered plumbago or other carbon, or with metal compounds by electrotype or other process, and then forms such coated or treated strands into a cord or rope of any required dimensions. A convenient method of using flexible burners is to wind them on a rotary axis or drum, which by its rotation would advance the burners each to the mouth of a tube or to a point where they would be consumed. The third part of his invention relates to obtaining electric light between electrodes or burners of any suitable kind by means of induced currents generated in conductors, or coils constructed according to his invention and placed at intervals along a main line or primary circuit, one or more near to where each light is required. These induction coils he forms of wires, or preferably of ribbons or sheets of copper and iron coiled together, and insulated from one another and in the different layers by any suitable non-conducting material, the main line or primary circuit passing through the copper and the induced current being created in the iron. They may be used with or without magnetisable cores or condensers. He sometimes arranges a series of these coils together, so that the induced current of the first shall become the inductive current of the second, and the induced current of the second become the inductive current of the third, and so on. Each induced current thus created may be supplimented by any local source of electricity. The group of coils may thus be made to sustain an increased light or a group of lights, or the separate lights may be arranged at any desired distance apart. To get the full effect out of these coils he uses a rapidly broken current of electricity to charge them, and therefore prefers as his source of electricity a magneto-electric machine with alternating or reverse currents.

CASTING STEEL INGOTS.

Steel ingots are ordinarily cast in vertical or nearly vertical moulds open at the lower end, and of larger sectional area at the bottom than at the top, so that the moulds may be lifted off when the ingots have become solid. Or the moulds are made in two or more parts, clamped or otherwise fastened together, so that they may be readily taken apart to allow of taking the ingots out. This mode of casting steel ingots requires much manual labour, and a considerable amount of space. It is also open to other objections, which it is the object of the invention of Mr. W. H. TAYLOR, of Panteg, Monmouthshire, to avoid. This he does by casting the ingots in a horizontal position, in either closed or open moulds, so constructed and mounted that the steel ingots when cast may be removed therefrom with much greater facility than when cast in single vertical moulds in the ordinary manner. In carrying out the invention he treats the liquid metal (before casting or running it into the moulds) by the addition to it of manganese or of manganese and silicon, or otherwise, as is well known, so that when cast in an open flat mould it will not boil up at the moment of setting or becoming unsound and full of blow holes. In some cases in order to slightly cool the metal so as to render it less lively (that is to say, less liable to boil or bubble up) and thereby form rough or unsounds ingots, full of blow holes or air bubbles, he runs it through a long trough or gutter into the horizontal moulds, which may be either open at top or provided with a lid or cover. These moulds (of which any convenient number may be used in combination) may be of any suitable size and shape so as to form ingots or pigs such as those into which pig-iron, copper, tin, lead, and spelter are ordinarily or frequently cast, the size and shape of the ingot depending upon the character of the manufactured article intended to be produced therefrom by the subsequent processes of rolling, hammering, or forging.

A convenient number of moulds may be arranged parallel to each other in a frame provided with trunnions, so that it may be turned over in order to tip out the ingots when they are sufficiently solid or set to admit of being handled and rolled or hammered in the usual way. Or, if preferred, the moulds may be constructed in the form of a long trough, made of cast-iron, and lined, if desired, with baked or burnt clay. Or the trough may consist of a wrought-iron or other strong frame, and the moulds formed therein of tiles or slabs made of baked or burned clay, and provided or not as may be preferred with lids or covers. These long troughs may be either of a triangular or V-shape in cross section, or of a quadrangular shape, but rather wider at top than at bottom. The lids or covers may either be loosely fitted to the moulds or they may be firmly secured in place by clamping or other suitable devices, so that the moulds may be turned bottom side uppermost without the lids or covers falling off. The object of thus temporarily securing the lids in place on the moulds is that they may be placed lid downwards on trucks or trolleys.

The moulds with the steel ingots in them may then be transported to any parts of the works, or by unclamping the lid the body of the mould may be lifted off, leaving the ingot on the inverted lid or cover. In these cases of long trough moulds the moulds will be arranged in a long line, end to end, and the separate moulds are made by placing cross tiles or blocks across the trough so as to form the ends of the ingots and divide up the space into separate compartments. As these cross tiles or blocks are movable they may be placed at any part of the trough so as to produce ingots of any desired length or weight. A passage or opening is made through the lower or some other convenient part of these transverse tiles or blocks for the purpose of allowing the molten steel to run into and through all the moulds so that they may be filled simultaneously or from one running. These long troughs or frames are provided at each end with a trunnion so that they can be turned over and the ingots tipped out, as in the former instance. In order to produce ingots of peculiar shape so as to form various articles by hammer-

ing or forging, moulds may be made of suitable shape in sand with the aid of wooden or other patterns, as when ordinary iron castings are required. By this means a considerable part of the labour of fashioning the article into the proper shape will be avoided.

MAXIMUM STRESSES IN FRAMED BRIDGES.—The valuable little treatise by Professor WILLIAM CAIN, A.M., C.E., published in Van Nostrand's Science Series—Practical Theory of Voussoir Arches—was noticed some time since in the *Mining Journal*, and had a very favourable reception from working engineers both in the United States and in this country. In a recently issued volume of the same series—Maximum Stresses in Framed Bridges (London: Trübner and Co., Ludgate Hill)—Professor Cain has given another evidence of the great facility with which he can supply exact scientific details in language thoroughly intelligible to practical engineers. The Professor has carefully and thoroughly investigated for the live loads assumed the maximum stresses that can ever occur in the chords as well as in the web members of a bridge. He has given a brief, yet sufficient, outline of previously published facts to enable the arguments, rules, and calculations which are referred to in the treatise to be readily understood, and has given every statement and fact so clearly that every engineer will be able to determine with accuracy and precision the best means of providing for any given amount of work to be borne, and likewise calculate in a few minutes (to within 2 per cent. of accuracy) the weight of materials that will be required. The treatise, which is reprinted from Van Nostrand's Electric Engineering Magazine, will prove of great utility to a very large number of engineers.

Cwm Brwyno Lead Mining Company

(LIMITED).

CAPITAL £30,000, IN 15,000 SHARES OF £2 EACH.

FIRST ISSUE OF 3000 SHARES AT PAR.

This company has one of the very best mines in Wales. And the fact of its being already *thoroughly developed and worked entirely by water power* only, should be sufficient to recommend it to investors.

The miners are now breaking down rich ore in several of the levels, and it is estimated that over £30,000 of ore can be got and dressed from what is in sight. There are two lodes in the sett untouched besides the one now opened, so there is an ample field for 20 or 30 years' working, and with the skipway renewed on the double principle, so as to facilitate the drawing of the ore, and improved dressing machinery, 100 tons of lead per month can be sent to market *at a small cost compared with those mines which are worked by steam machinery.*

Application for prospectuses and shares to be made to the Secretary, at the offices of the company, 14 and 15, St. Swithin's-lane, E.C.; or to any of the Branches of the National Provincial Bank of England.

EXTRACT FROM MANAGER'S REPORT MADE TO THE DIRECTORS AT THEIR BOARD MEETING, ON THE 2ND INST.

"I have to report that Cwm Brwyno, after long quietude, is now actively at work. The weather having improved, so as to enable us to get water from the mountains, we have now all the wheels at work, and shall go on dressing as quickly as our present inferior dressing machines will allow; but we can never expect to make large returns till we get the new machinery erected, the importance of which I cannot too forcibly impress on the attention of the directors. The 80 fm. level end driving now continues to improve, and is already in a good course of ore intact from the 56 fm. level. The 80 fm. level stope is also good working for silver ore (samples of which you have before you, showing a much larger proportion of silver than that assayed). We are not at the 92 fm. level yet, but by continual pumping we must reach it in a day or two."

EXTRACT OF REPORT, APRIL 8.

"Since my last report of the 2nd inst. the water has been forked down to the 104, at which level, and also in the 92 west, lead ore can be seen worth 4 tons to the fathom. The machines are now busy dressing the ore on surface, and we shall have a parcel of 30 tons for sale this month, and every month will find an increase in our production."

ABRIDGED PROSPECTUS.

THE

South Devon United Copper Mines

(LIMITED).

Registered under the Companies Acts, 1862 and 1867.

CAPITAL £30,000, IN 6000 SHARES OF £5 EACH.

With power to increase.

(1820 Shares have been taken and fully paid up by the Directors and their friends.)

20s. per share to be paid on application; £2 on allotment; and £2 in three months, viz.:—

For purchase of Wheal Emma Mine and Water Rights in fully paid up shares...	£ 9,700
For the purchase of Brookwood Mine, cash	10,000
For working capital and expenses	10,300
Total...	£30,000

DIRECTORS.

CHAIRMAN—HENRY MARTIN, Esq., Sussex House, Highbury New Park, London, N.
Col. The Hon. HENRY BUTLER-JOHNSTONE, 8, Seamore-place, Mayfair, W., and Auchen Castle, Moffat, N.B.
Lieut.-Col. JOHN CRAIGIE HALKETT, Cramond, Midlothian, N.B.
JOHN MONCASTER MITCHESON, Esq., The Grove, Stratford, Essex.
Rear-Admiral JASPER HENRY SELWYN, R.N., 16, Gloucester Crescent, Hyde Park.
(With power to add to their number.)

BANKERS—NATIONAL PROVINCIAL BANK OF ENGLAND, Bishopsgate-street, London, E.C.
SOLICITORS—Messrs. PATTISON, WIGG, GURNEY, and KING, 11, Queen Victoria-street, London, E.C.
SECRETARY—MR. WILLIAM BATTYE.

Offices of the Company—16, GREAT WINCHESTER STREET, LONDON, E.C.

This company has been formed to work the Wheal Emma and Brookwood Mines, Buckfastleigh, Devonshire, under lease from the Earl of Macclesfield for 21 years, at a royalty of 1 24th (minimum £50 per annum), and sundry water and surface rents amounting to £191 10s. per annum.

These two properties, hitherto separately held, have constantly suffered from the baneful effects of antagonistic proceedings, owing to disputes about water rights, &c., but will by this union possess facilities for the rapid development, under one management, of the mineral wealth known to exist therein. The whole of the water rights have by arrangement become vested in the lessor of the mines, and are included in the lease by him to the company.

The Brookwood Mine has produced and sold upwards of £96,000 worth of ore, and it is credibly reported that a still larger quantity has been produced and sold by Wheal Emma.

Capt. Hooper reports that there is now known to exist, opened and ready for extraction at Brookwood, copper ore valued by him at from £30,000 to £90,000, with large bodies of mineral extending both east and west. Worked as one concern he further states his opinion to be that "Brookwood can at once return large profits, which will increase in proportion to the force employed in development," and with reference to the capabilities of Wheal Emma, he states his opinion to be, "with a small expenditure it would make annual profits equal to Brookwood." Reference is made to his report given below. The lodes underlie to the south about 3 ft. in the fathom, and are mostly worked on the run of the lode; all measurements are on this basis.

Capt. Hooper is a man of known skill and integrity; he has had large experience in the management of dividend paying mines, and was for several years the underground manager of Brookwood, and subsequently of Wheal Emma. During his tenure of office Brookwood returned good dividends, and his statements as to the capabilities of both properties are made from intimate knowledge of the existing courses of ore.

Judging from his report the two properties under good management should embrace a source of wealth sufficient to return handsome dividends at once and for many years to come, even at the present exceptionally low price of copper, a conclusion which the directors see no reason to doubt, since the minimum out turn of 200 tons of copper ore per month, besides muudic, easily attainable with improved methods of mining and dressing, would probably give profits amounting to £4000 per year, and there are three other lodes which have been cut, of which the great north lode is likely to prove quite as rich as the one which is now being worked, having already been proved in more than one place.

CAPT. WILLIAM HOOPER'S REPORT.

WHEAL EMMA AND BROOKWOOD MINES.

William Battye, Esq. *Tavistock, May* 28th, 1878.

DEAR SIR,—I need not enter into details as to the situation, length and breadth of these properties, as you are well aware they are of great extent from east to west on the run of the lodes.

EMMA SECTION.

The workings in this part of the property down to the 100 fms. from surface, have yielded over £100,000 worth of rich mineral; at this depth the vein entered a different channel of ground. To pass through this, a new shaft was sunk from surface down to a depth of 140 fms., at which point the lode has been cut through 18 ft. wide, and a better defined lode cannot be found in this country, and such a one that cannot fail to produce many thousands of tons of copper; in fact I cannot speak too highly of it, having well defined walls and in beautiful light strata of ground, such as all the great deposits of copper ore are found in. This shaft is close to Brookwood Boundary, and could the properties be worked as one concern by driving the deep level into Brookwood, under the known mineral courses, large returns could at once be made. I know of no mine so well situated as this one, it being supplied with the best of machinery and water power. There is a great prize here for someone.

With an expenditure of £2000, I feel confident (seeing that all the heavy preparatory work has been accomplished) that this part of the property would make annual profits equal to Brookwood.

BROOKWOOD SECTION.

The engine-shaft here is sunk down to the 120 fm. level and the lode intersected yielding rich ore; but owing to the influx of water from the Emma section very little has been done, but as far as seen the vein has rich copper ore of equal value to the levels above.

The 110 fm. level has been driven west from the engine shaft, 50 fms. through a lode varying in value from £10 to £40 per fathom, and from which large quantities of ore have been, and still are to be, taken away.

The 100 fm. level driven east from the engine-shaft has for the last 40 fathoms varied in value from £30 to £100 per fathom; the vein in the present end is worth £50 per fathom, with every prospect of its continuing for a great distance, it being very strong and in a beautiful channel of ground, such as the large masses of copper in this district have been found in.

The 90 fm. level has been driven many fathoms through a lode varying in value from £30 to £50 per fathom. The end of this level is several fathoms behind the 100, and is steadily improving as it continues east. There are several stopes in the back of this level from which large returns can be made.

The 80 fm. level has not been extended east as far as the 90 or 100 levels, but the last few fathoms driving has opened out some profitable ground, and is now getting into the same vein of ore as the other levels, and no doubt by continuing it will open up similar valuable ground.

From the 60 and 70 fm. levels many thousands of tons of copper and muudic have been sold and have given large profits. These levels should be extended further, when, in my opinion, further important discoveries will be made With all these levels exposing such quantities of ore, their continuation cannot fail to produce large and profitable returns The mineral already known to exist in Brookwood, I value at between £80,000 and £95,000, and worked in combination with Emma, and utilising the latter's shaft and dressing floors, I feel sure we could at once return profits at the rate of £5,000 per annum, and increase in proportion to the force employed in development. The machinery on the two properties consists of one steam-engine and numerous large water-wheels for pumping, hauling, and dressing, and all these are in working order, with ample water-power for all purposes. The valuation of the surface plant alone I estimate to be £6,500.

If it is in contemplation to unite these two properties, and work them as one concern, securing the water-power for that purpose, I have no hesitation in saying that in that case you have one of the finest mineral properties in the kingdom.

I speak with knowledge and authority on the subject of these properties from the experience I have had in the underground workings of both mines, in both of which I held an ageney for years, and in the case of the Brookwood I had the pleasure of giving a higher rate of dividend than they have had from any other agents, although, through restricted management, I was prevented from giving what the mine is capable of doing under liberal working.

WILLIAM HOOPER.

SOUTH DEVON UNITED MINES.

William Battye, Esq. *Devon Great Consols, January* 18th, 1879.

SIR,—In accordance with the request of the directors, I, on the 8th and 9th inst., visited the above mines, and measured the large accumulation of halvans on the Brookwood portion of the property.

The different burrows contain 3518 cubic fathoms, which will yield 8 tons per fathom, making 28,144 tons. From different portions of the burrows I took fair average samples, which I since had carefully assayed, and from these assays I estimate that at the present standard the burrows will yield ores of the value of £14,00 . At a fair ordinary standard the value would be nearly, if not quite, double this amount.

From the situation of the burrows dressing machinery could be erected to great advantage, and the water power is amply sufficient for all purposes that may be required.

The halvans are of an unusually favourable character for dressing, and with modern improved machinery, as proposed by Capt. Hooper, large quantities could be treated with ease and dispatch, leaving a good profit to the company.

WILLIAM CLEMO.

Original Correspondence.

THE POLITICAL IMPORTANCE OF MINING.

SIR,—The vast importance of the silver question to our Indian Empire, to which I alluded in my letter to your Journal last week, was illustrated by the deputation from the Liverpool Chamber of Commerce in the interview with the Chancellor of the Exchequer on Friday last. The conclusions reached by the Liverpool Chamber of Commerce coincide with those at which I had long since arrived, and had publicly expressed. The "deputation" dwelt on the existing great depreciation in the value of silver, and the prospects of a still greater fall. They attributed to this cause much of the existing falling off in exports; alluded to the vital interests affected by it in India, and advocated legislation in the direction of facilitating the use of silver currency.

The Chancellor of the Exchequer, in reply, admitted the great importance of the question, which would be fully considered by the Government, but expressed doubts as to the measures proposed, benefiting debtors, and leaving no one losers. He further put the query—"Are you sure that that the measure you require, even if it makes no change in the relations between the precious metals and other commodities, will prevent alteration in the comparative values of gold and silver?"

There can be no doubt that Sir Stafford Northcote was right in assuming that an alteration in the value of coin which would benefit debtors must produce a corresponding loss to creditors, and I quite agree with his suggestion that the relative values of gold and silver must continue to fluctuate just as either metal becomes scarce or plentiful. In 1850 I was so convinced that land must have a rapid rise in value in relation to money, and that mortgagors would speedily find one-fourth of their burden virtually taken off, that I laid my views before an influential member of Parliament, and proposed to him a financial operation of great magnitude, based on the state of things I believed to be imminent. He expressed great interest in the subject, and thought my theory correct, but gave me the friendly warning that in his experience there were so many contingencies to be taken into account that it was unsafe to rely on crude problems, however certain the deductions from them might appear to be.

It is the effect of human passions, follies, and crimes which, above all other contingencies, affect the currency question, which Lord Beaconsfield calls an "abstruse one," though it would be simple enough if it merely related to money and goods.

As the chief object of good government is to protect the weak, and as debtors are relatively less strong than creditors, it is clearly the duty of rulers, in legislating on the important subject of the currency, to avoid passing any measure tending to increase artificially the value of coin, or operating to diminish the amount in circulation. It appears to me the rankest injustice, as well as the most flagrant impolicy, to demonetise silver because that is becoming more plentiful and gold scarcer. It is obviously the only safe course to make the more use of silver money as legal tender the more it becomes abundant; and I would suggest that the reserve which the Bank of England in certain contingencies is bound to have in gold should be changed for the alternative of gold or silver.

It is written that—"No man liveth or dieth to himself." It is a very singular fact, as affecting the currency question, how wonderfully it has been influenced for ages by the 30 pieces of silver paid to Judas for the betrayal of his Master, and the subsequent dispersion of the Jews. While existing as an eminently pastoral and agricultural people it was predicted of them that they would become landless wanderers. They did become the chief capitalists of the world, and the chief influences in financial operations and currency legislation. Naturally their influence has been exerted to favour money wealth at the cost of land and labour; wide-spread ignorance of the causes induced long submission to the effects. Sometimes political revolutions brought relief, but the greatest and most effectual revolution and emancipation are due to the successful mining operations of the past 30 years. JOHN ELLIOTT.

April 10.

[In last week's Journal, in giving the quotation from my letter published in the Mark Lane Express of April 1, 1850, you make me to predict that interest would speedily be at 5 per cent., the 5 being a mistake for 2 per cent, to which latter sum interest did fall within the time I stipulated, and but for the lavish waste in war money would have continued to be as cheap for many years.]

RICHMOND COMPANY.

SIR,—As the annual stock-taking was fixed for the beginning of February the accounts must shortly be in the hands of the directors. The beginning of the year was a period of unexampled prosperity, and notwithstanding the great falling off at its close, the average of the year must be a good one. After eight years' experience of the fluctuations to which this mine has been so frequently exposed, it is greatly to be regretted that the only opportunity in its history of creating a good reserve fund should have been lost by the distribution in dividends of the whole of the profits, leaving barely sufficient, according to my calculations, to meet the debentures now due. It is true that the late disastrous fire was an unexpected contingency, but the cost of the restoration of the works must absorb the greater portion of the profits made since restarting them, the grade of the ore having been so low at a period of unexampled depression in lead and silver. It will, doubtless, be a great disappointment to us all if no dividend is forthcoming, but in the face of existing facts, and the knowledge that in the coming legal contest with our powerful opponent it is of such vital importance to strengthen our right by pecuniary might, that it would be unwise to empty our coffers, even if there is anything in them, and suicidal to incur onerous obligations to our bullion agent for the mere object of dividend. AN OLD SHAREHOLDER.

April 8.

[ADVERTISEMENT.]

LLANRWST MINE, AND MR. H. G. SHARP.

SIR,—I have not much time to devote to Mr. H. G. Sharp and his advertisement, but just wish to say this—I am prepared to prove all I said at the Llanrwst meeting, and am satisfied that those who know him must by this time be quite convinced as to his disinterested motives in attacking the Llanrwst Mine, and thus evincing his regard for the pockets of its shareholders by doing his best to enhance (?) the value of their shares. If this has been his object for the past 18 months I have cruelly misjudged him. But I did not mention his name at the meeting; however, "a guilty conscience needs no accuser"—probably this is the reason why he appropriates my observations to himself. I hope soon to have done with Mr. Sharp, and do not intend henceforth to trouble myself with his meaningless rhodomontade, either in the Journal or elsewhere.

Now as to these 400 Llanrwst shares he had to offer. I assert that the shareholder from whom he obtained them was anxious to be off his bargain, as far as "East Craven Moor" shares were concerned, but Mr. Sharp insisted upon his completing the business. Does not this show that he was anxious to get the Llanrwst shares? I think he charged at the rate of 9*l.* or 10*l.* each for the East Cravens. I may probably have occasion to publish the letters between Mr. Sharp and the holder of these 400 Llanrwsts. As some of these 400 shares came through Mr. J. Davidson, who was apparently Mr. H. G. Sharp's nominee, he must know more about his advertisement than I do. I thought he had quarrelled with Davidson—hence the advertisement he quoted.

I would ask him this question—Is is not a fact that 100 fully paid East Craven Moor shares were recently hawked through the market at 5*l.*, and could find no buyers? and did he not himself buy them at 4*l.* 10*s.* of a broker in the Stock Exchange? and was he not, then, recommending them in his circular at from 9*l.* to 10*l.* each? The majority of shares in East Craven Moor Mine are still liable for further calls of 5*l.* or 6*l.* per share, and as no one cares to buy shares subject to such calls, the result is that intending sellers cannot get out if they want to, and intending buyers will only take fully paid shares. West Craven Moor shares are now all fully paid up, and what is their quotation? It would be almost, if not quite, impossible to get 3*l.* 10*s.* each for them if put on the market.

I take exception to Mr. H. G. Sharp's recommendation to the shareholders in Llanrwst to buy his 144 shares. I do most firmly and conscientiously believe in the great value of this mine and its future prospects, but I do not recommend shareholders to buy these shares of Mr. Sharp. He can puff his own wares without relying upon my opinion of the property. G. S. GREGORY.

[For remainder of Original Correspondence, see to-day's Supplement.]

J. S. MERRY,
ASSAYER AND ANALYTICAL CHEMIST,
SWANSEA.
SUPPLIES ASSAY OFFICE REQUISEMENTS AND RE-AGENTS.

PARIS EXHIBITION, 1878.

GOLD AND SILVER MEDALS AWARDED for Steam-Engines & Boilers, also the Special Steam Pump, with Holman's Condenser & Compound Pumping Engine.

TANGYE BROTHERS AND HOLMAN,

HYDRAULIC AND GENERAL ENGINEERS

CORNWALL HOUSE, 35, QUEEN VICTORIA STREET, LONDON, E.C.,

AND BIRMINGHAM, (TANGYE BROTHERS), CORNWALL WORKS SOHO.

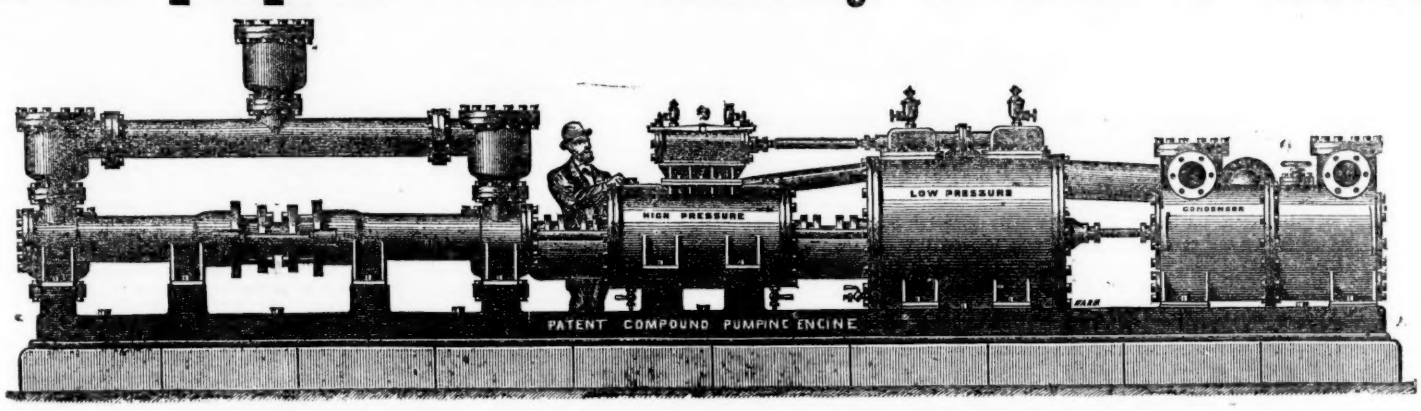
THE "SPECIAL"

DIRECT-ACTING

COMPOUND PUMPING ENGINE,

For use in Mines, Water Works, Sewage Works,

And all purposes where Economy of Fuel is essential.



THE "SPECIAL" DIRECT-ACTING COMPOUND PUMPING ENGINE, WITH AIR-PUMP CONDENSER.

After several years of successful application for all purposes to which steam-driven pumps can be applied, THE "SPECIAL" STEAM PUMP STILL MAINTAINS THE FIRST POSITION IN THE MARKET, notwithstanding that it alone—of all direct-acting pumps—has been subjected to the great variety of severe tests that must be encountered in such a period of time. Some valuable improvements have been suggested in the course of a long experience, and their adoption has rendered the apparatus at once

THE SIMPLEST AND MOST CERTAIN IN ACTION.

The illustration shows an extension of the principle of this Pump to a Compound Steam Pumping Engine, by which the economical advantages resulting from the expansion and condensation of steam are very simply and effectively obtained. The steam after leaving the high-pressure cylinder is received into and expanded in the low-pressure cylinder, and is thus used twice over before being exhausted into the condenser or atmosphere. The Engine combines simplicity, certainty of action, great compactness, fewness of parts, and consequent reduction in wear and tear.

Several thousands of the "Special" Steam Pumping Engines, with high-pressure cylinders only, are in use in British and Foreign Mines, Water Works, &c.,—and for confined situations, or where Engines of a comparatively small size only are necessary, they will still meet all requirements—but their application will be very largely increased, since it has been found practicable to embrace the important features of expanding and condensing the steam, so that increased power may be obtained, and the consumption of fuel greatly economised.

THE "SPECIAL" DIRECT-ACTING COMPOUND STEAM PUMPING ENGINE is the most simple appliance for deep mine draining and general purposes of pumping ever practically developed, and the first cost is very moderate compared with the method of raising water from great depths by a series of 40 to 50 fathom lifts. No costly engine-houses or massive foundations, no repetition of plunger lifts, ponderous connecting rods, or complication of pit-work are required, while they allow a clear shaft for hauling purposes.

SIZES AND PARTICULARS.

Diameter of High-pressure Cylinder.....In.	8	8	8	10	10	10	10	12	12	12	12	14	14	14	14
Ditto of Low-pressure Cylinder .....In.	14	14	14	18	18	18	18	21	21	21	21	24	24	24	24
Ditto of Water Cylinder .....In.	4	5	6	5	6	7	8	6	7	8	10	7	8	10	12
Length of stroke .....In.	24	24	24	24	24	24	24	24	24	24	24	36	36	36	36
Gallons per hour approximate	3900	6100	8800	6100	8800	12,000	15,650	8,800	12,000	15,650	24,450	12,000	15,650	24,450	35,225
Diameter Suction and Delivery .....In.	3	3½	4	3½	4	5	6	4	5	6	8	5	6	8	9
Diameter High-pressure Steam Inlet.....In.	1½	1½	1½	1½	1½	1½	1½	2½	2½	2½	2½	2½	2½	2½	2½
Diameter Low-pressure Steam Exhaust.....In.	1½	1½	1½	1¾	1¾	1¾	1¾	2½	2½	2½	2½	2½	2½	2½	2½
Height in feet water can be raised with 40 lbs. pressure per square inch in cylinder ..... Non-condensing..	360	330	160	360	250	184	140	360	264	202	130	360	275	175	122
Ditto ditto ditto—with Holman's Condenser...	480	307	213	480	333	245	187	480	352	269	173	480	367	234	162
Ditto ditto ditto—with Air-pump Condenser...	600	384	267	600	417	306	335	600	440	337	216	600	459	203	203

CONTINUED.

Diameter of High-pressure Cylinder .....In.	16	16	16	16	18	18	18	18	21	21	21	24	24	24	30	30
Ditto of Low-pressure Cylinder .....In.	28	28	28	28	32	32	32	32	36	36	36	42	42	42	52	52
Ditto of Water Cylinder .....In.	8	10	12	14	8	10	12	14	10	12	14	10	12	14	12	14
Length of stroke .....In.	36	36	36	36	48	48	48	48	48	48	48	48	48	48	48	48
Gallons per hour approximate	15,650	24,450	35,225	47,950	13,650	24,450	35,225	47,950	24,450	35,225	47,950	24,450	35,225	47,050	35,225	47,950
Diameter Suction and Delivery .....In.	6	8	9	10	6	8	9	10	8	9	10	8	9	10	9	10
Diameter High-pressure Steam Inlet.....In.	2½	2½	2½	2½	3	3	3	3	3½	3½	3½	4	4	4	5½	5½
Diameter Low-pressure Steam Exhaust.....In.	3	2	3	3	3½	3½	3½	3½	4	4	4	5	5	5	6½	6½
Height in feet water can be raised with 40 lbs. pressure per square inch in cylinder ..... Non-condensing..	360	230	160	118	456	292	202	149	397	276	202	518	360	264	562	
Ditto ditto ditto—with Holman's Condenser...	480	307	213	154	603	389	269	198	528	363	269	691	480	352	750	
Ditto ditto ditto—with Air-pump Condenser...	600	384	267	191	750	486	337	248	660	450	337	864	600	440	937	

PRICES GIVEN ON RECEIPT OF REQUIREMENTS.

Any number of these Engines can be placed side by side, to work in conjunction or separately as desired, thereby multiplying the work of one Pump to any extent.

NORTH OF ENGLAND HOUSE ... ... TANGYE BROTHERS, ST. NICHOLAS BUILDINGS, NEWCASTLE-ON-TYNE.
SOUTH WALES HOUSE... ... ... TANGYE BROTHERS AND STERN, Tredegar Place, NEWPORT, Mon.; and Exchange Buildings, SWANSEA

THE LIST OF APPLICATIONS FOR SHARES WILL CLOSE ON APRIL 22ND, 1879.

The National Bank of Wales

(LIMITED).

ncorporated under the Companies Acts, 1862 and 1867.

CAPITAL £2,000,000, IN 100,000 SHARES OF £20 EACH.

FIRST ISSUE 10,000 SHARES AT PAR.

PAYABLE AS FOLLOWS:—

£2 10s. on allotment. Future calls not to exceed £2 10s. per share at intervals of not less than three months.

(NO PAYMENT REQUIRED ON APPLICATION.)

IT IS NOT INTENDED TO CALL UP MORE THAN £10 PER SHARE.

DIRECTORS.

FREDERICK G. GARDINER, Esq., Boundary House, Sale, Cheshire.
MORGAN LLOYD, Esq., Q.C., M.P., Chester Square, London, S.W.
HENRY ATKINSON, Esq., Westwood, Altrincham, Cheshire.
FRANCIS R. CRAWSHAY, Esq., J.P., Forest House, Pontypridd, Glamorganshire.
GEORGE WATTS, Esq. (Messrs. S. and J. Watts and Co.), Portland-street, Manchester, and Northbrook House, Burnage.
T. STANLEY STEPHENSON, Esq. (Messrs. Butterworths and Stephenson), Manchester, and Irlam Hall, near Manchester.
(With power to add to their number.)

The establishment of this Bank has met with the entire approval of the leading wholesale houses in Manchester interested in the trade between Manchester and North and South Wales.

SOLICITORS.

Messrs. ATKINSON, SAUNDERS, and CO., 3, Norfolk-street, Manchester.
E. ATKINSON, Esq., Haworth's Buildings, Cross-street, Manchester.

AUDITORS.

Messrs. KIDSON AND BACKHOUSE, St. James's Square, Manchester.

TEMPORARY OFFICES,—3, NORFOLK STREET, MANCHESTER.

PROSPECTUS.

Since any banking company was established for the express purpose of affording direct banking facilities for North and South Wales the population, wealth, and general trading operations have more than trebled, and many extensive districts are, at the present time, totally unprovided with banking facilities.

It has been matter of surprise that no additional banking accommodation has been provided to further develope the resources of these important districts. Whilst there is a Bank of England, a Bank of Ireland, and a Bank of Scotland, there is no National Bank for the Principality.

The head office of the bank will be in Manchester, as being one of the chief centres of commerce for North and South Wales—hence the necessity for this bank, no direct banking communication existing at the present time.

The establishment of joint-stock banks in various parts of the United Kingdom has been followed by great success, and the shares of such companies command high premiums.

The following quotations, taken from the Stock Exchange Lists of March 31, 1879, confirm this statement:—

Name of Bank.	Amount paid up per share.	Present Market Price.	Last Dividends.
London and Provincial Bank (Limited)	£ 5 0 0	£10 10 0	12½ per cent.
National Provincial Bank of England, Head Office, London	21 0 0	73 10 0	20 „
Manchester and County Bank (Limited)	15 0 0	35 10 0	15 „
Manchester and Liverpool District Bank	10 0 0	31 0 0	20 „
Manchester and Salford Bank	8 0 0	14 0 0	12½ „
Manchester Joint-Stock Bank (Limited)	6 0 0	12 5 0	13½ „
Parr's Banking Company (Limited)	20 0 0	56 0 0	20 „
The Birmingham Joint-Stock (Limited)	10 0 0	32 0 0	20 „
Lloyds Banking Company (Limited)	8 0 0	23 10 0	20 „

Although the capital of the National Bank of Wales (Limited) has been fixed at £2,000,000, in 100,000 shares of £20 each, it is proposed at first to issue only 10,000 shares at par; subsequent issues will be upon such terms and at such times as may be thought expedient, and it is not intended to call up a greater amount than £10 per share; thus leaving a large capital uncalled, which will form a sound guarantee to depositors and customers.

In settling the Articles of Association the directors have been guided by the experience of the most successful modern banks. Powers have been taken to carry on every safe form of banking, so as to secure a fair return upon the capital invested. It is intended to conduct the business so that every legitimate trader, however small his transactions, and all sound trading shall be encouraged.

The Articles of Association stipulate that no dividend on the shares beyond SIX PER CENT. PER ANNUM shall be paid until a reserve fund has been created amounting to at least ONE-FIFTH OF THE PAID-UP CAPITAL.

It is intended that periodical audits shall be rigidly enforced, and every yearly audit shall be under the supervision of an independent auditor, nominated by the shareholders.

The National Bank of Wales possesess an advantage over some of the existing leading banks from the fact that the liability of each shareholder in this bank is strictly limited by law to the amount subscribed for.

The directors wish to call special attention to the fact that the banking business of the country is fast passing from the hands of private bankers to that of joint stock companies.

A contract was entered into on behalf of the company, dated 20th December, 1878, and made between Charles Pitt, jun., of the one part, and William Walker, as agent for and on behalf of the company, of the other part; but such agreement has expired by effluxion of time, and the company, therefore, is not in any way affected by such contract; and the only contract entered into on behalf of the company which now affects it is one dated the 3rd day of April, 1879, and made between Henry Russell Evans, of the one part, and William Walker, as agent for and on behalf of the company, of the other part, which provides for and limits the amount to be paid for preliminary expenses, registration, &c. This contract, together with the Articles of Association, may be seen at the offices of the solicitors.

Arrangements will be made to commence immediate operations in Manchester and the principal towns of North and South Wales, and the promises of support already received warrant the directors in anticipating a large and profitable business.

It is well known that those who are interested in the success of a bank not only carry on their own business with such bank, but exert themselves to promote its general prosperity. The nominal value of the shares has been fixed at such a sum as to enable all customers to become shareholders in the bank, and thus participate in the profits of the company.

The directors have offers of several suitable sites for banking premises, both for the head offices and branches.

To ensure the safety of applicants for shares, and that the business shall not be commenced before the subscription of adequate capital, no allotment will be made until all the 10,000 shares forming the first issue have been applied for, and no applicant for shares can be called upon to pay any money until the whole of the first issue has been allotted.

ALREADY A LARGE AMOUNT HAS BEEN PRIVATELY SUBSCRIBED.

The directors are in no way pledged to the appointment of officers, but the assistance of gentlemen thoroughly conversant with the banking business of Manchester and the Principality will be secured for the management of the bank.

Applications for shares to be forwarded to the Solicitors or Auditors, from whom prospectuses and all information may be obtained.

WATSON BROTHERS' MINING CIRCULAR.

WATSON BROTHERS,
MINEOWNERS, STOCK AND SHARE DEALERS, &c.
1, ST. MICHAEL'S ALLEY, CORNHILL, LONDON.

Ten years ago the weekly information which had previously been published for a great number of years in WATSON BROTHERS' Mining Circular was transferred to the columns of the *Mining Journal*, with the following announcement; which is now reproduced in consequence of the numerous letters and enquiries handed to them of late in reply to one which appeared in the Journal on the Clementina Mine.

In the year 1843, when mining was almost unknown to the general public attention was first called to its advantages, when properly conducted, in the 'Compendium of British Mining," commenced in 1837, and published in 1843, y Mr. WATSON, F.G.S., author of "Gleanings among Mines and Miners," "Records of Ancient Mining," "Cornish Notes" (first series, 1862), "Cornish Notes" (second series, 1863), "The Progress of Mining," with Statistics of the Mining Interest, annually for 21 years, &c., &c. In the Compendium, published in 1843, Mr. WATSON was the first to recommend the system of a "division of small risks in several mines, ensuring the success in the aggregate," and Messrs. WATSON BROTHERS have always a selected list on hand. Perhaps at no former eriod in the annals of mining has there been more peculiar need of honest and experienced advice in regard to mines and sharedealing than there is at present; and from the lengthened experience of Messrs. WATSON BROTHERS they are emboldened to offer, thus publicly, their best services and advice to all connected with mines and mining.

Messrs. WATSON BROTHERS are daily asked their opinion of particular mines, as well as to *recommend* mines to invest or speculate in, and they give their advice and recommend mines to the best of their judgment and ability, ounded on the best practical advice they can obtain from the mining districts, ut they will not be held responsible, nor subject to blame, if results do not always equal the expectationsthey may have held out in a property so fluctuating as mining.

The great extension of mining business, the difficulty so often complained of by country shareholders in getting accurate and disinterested information as to the state of Cornish and Foreign Mines, and of the financial and real position of mining companies generally, have induced Messrs. WATSON BROTHERS to make their Circular now published in the *Mining Journal* more extensively known, and to state—

That they issue daily to clients and others who apply for it a Price List (as supplied to most of the London and country papers), giving the closing prices of Mining Shares up to Four o'clock.

They also buy and sell shares for immediate cash or for the usual fornightly ettlement in all Mines dealt in on the Mining and Stock Exchanges, at the close market prices of the day, free of all charges for commission. They deal also, on the same terms, in the Public Funds, Railways, Telegraphs, and all other Securities dealt in upon the Stock Exchange.

Having agents in all the mining districts, they are constantly getting mines inspected for their own guidance, and will also obtain special reports of any particular mine for their clients, for the inspecting agent's fee of £2 2s.

COPPER.—Peru and Bolivia, it is said, have entered into an offensive and defensive alliance, and declared war against Chili. This may have a very important bearing upon the copper trade, as a large supply comes from Chili. We shall certainly hope to see better prices.

SOUTH DEVON UNITED.—The Brookwood Mines were worked by the Liskeard party under the same management, we believe, as Herodsfoot, made very large returns of rich copper, and paid good dividends. Wheal Emma was worked by another company, and there were endless disputes and lawsuits respecting the water rights. Brookwood has returned 96,000*l.* worth of copper, and has now been sold to the proprietors of Wheal Emma for 10,000*l.* in cash, and the two mines have been amalgamated under the name of "South Devon United." The Wheal Emma proprietors take 9700*l.* in fully-up shares for the mine and all the water rights, and as the United Company is in 6000 shares of 5*l.* each, the working capital is 10,300*l.* One of the agents considers there are very large reserves in Brookwood, and that it can at once make profits.

HERODSFOOT.—This mine and company is quite a distinct affair from the "Old Herodsfoot," upon which so many letters have appeared in the Journal.

GLENROY.—The lode is 7 to 8 ft. wide in the shaft; our own opinion has been that depth only was required to make it productive, and we are glad to see from the last report that in the bottom there is now a more genial quartz, with a little lead and blende; when a little deeper levels will be driven upon the lode.

POOR ORES.—We called attention to Hollway's process for utilising sulphides in connection with poor ores a few weeks ago, and to the vast importance it might be, if successful, to the Parys Mountain. In the Times of Thursday there is a notice of the experiments concluded at the Atlas Works, Sheffield, on Wednesday, in the presence of a large number of gentlemen from different parts of the country and abroad. These experiments were considered highly satisfactory, and may, according to the Times correspondent, revolutionise the system of copper smelting.

SATURDAY, APRIL 5.—Market firmer for both tin and copper shares. Carn Brea, 30 to 32; Dolcoath, 27 to 29; South Condurrow, 11½ to 12; South Frances, 10¾ to 10¾; Tincroft, 10 to 10½; Peevor, 9¾ to 9¾; West Basset, 4¾ to 5¼; West Frances, 5 to 5½; Van, 20 to 21; Great Laxey, 16 to 16½; Roman Gravels, 8¾ to 8¾; Aberllyn, 10 to 12; Herodsfoot, 3 to 4; Leadhills, 2¾ to 2¾; Tankerville, 3½ to 3¾; Parys Mountain, 10s. to 12s.; Crebor, 6s. to 8s.; Devon Great Consols, 2 to 2¼; Grenville, 3 to 3¼; West Tolgus, 30 to 32; Agar, 3½ to 4.

MONDAY, APRIL 7.—The demand for tin and copper shares continues, and prices are again firmer. Carn Brea, 31 to 33; South Condurrow, 11¾ to 12¼; South Frances, 10¾ to 10¾; Tincroft, 10¼ to 11; West Basset, 5 to 5½; Peevor, 9¼ to 9¾; Dolcoath, 27 to 29; West Tolgus, 30 to 32; Mellanear, 3¼ to 3¾; Devon Great Consols, 2 to 2½; Parys Mountain, 10s. to 12s. 6d.; West Chiverton, 30s. to 35s.; Van, 20 to 21; Great Laxey, 16 to 16½; Tankerville, 3½ to 3¾; Herodsfoot, 3 to 4; East Van, 1⅞ to 2⅛; Bettws-y-Coed, 20s. to 25s.; Santa Barbara, 2¼ to 2¾; Don Pedro, 1*l*s. to 17s.

TUESDAY, APRIL 8.—Market firmer for tin shares. Carn Brea, 31 to 33; Dolcoath, 28 to 30; South Frances, 10½ to 11; West Frances, 5¼ to 5¾; South Condurrow, 11¾ to 12¼; Tincroft, 10 to 11; Peevor, 9¼ to 9¾; Roman Gravels, 8½ to 9; Van, 20 to 21; Great Laxey, 15½ to 16½; Herodsfoot, 3 to 4; Aberllyn, 10 to 12; Leadhills, 2¼ to 2¾ Tankerville, 3½ to 3¾; West Chiverton, 2 to 2½; East Van, 1⅞ to 2⅛; Glenroy, 7s. 6d. to 12s. 6d.; West Tolgus, 29 to 31; Mellanear, 3½ to 3¾; Marke Valley, 10s. to 12s. 6d.; Crebor, 6s. to 8s.; Devon Great Consols, 2 to 2¼; Parys Mountain, 10s. to 12s. 6d.; Richmond, 9 to 9¼; Santa Barbara, 2¼ to 2½; Don Pedro, 15s. to 16s.; Arundal, 3½ to 4⅛.

WEDNESDAY, APRIL 9.—Market quiet, tin shares weaker. Carn Brea, 30 to 32; Dolcoath, 27 to 29; South Frances, 10¼ to 10¾; Tincroft, 10 to 10⅛; West Basset, 4¾ to 5¼; West Frances, 5 to 5½; Peevor, 9¼ to 9¾; Grenville firmer at 3¼ to 3¼; Van, 20 to 21; Great Laxey, 15½ to 16½; Roman Gravels, 8½ to 9; Herodsfoot, 3 to 4; Tankerville, 3¼ to 3¾; West Chiverton, 2¼ to 2¾; Aberllyn 10 to 12; Bettws-y-coed, 20s. to 2*l*s.; Marke Valley, 10s. to 15s.; Mellanear, 3½ to 3¾; West Tolgus, 27 to 29; Crebor, 5s. to 7s 6d.; Parys Mountain, 10s. to 12s. 6d.

THURSDAY, APRIL 10.—Market very quiet. Van, 20 to 21; Great Laxey, 15¼ to 16½; Roman Gravels, 8½ to 9; Herodsfoot, 3 to 4; Tankerville, 3¼ to 3¾; West Chiverton, 2¾ to 3¼; East Van, 1¾ to 2; Carn Brea, 30 to 32; Dolcoath, 27 to 29; South Frances, 10¼ to 10¾; South Condurrow, 11½ to 12; West Frances, 5¼ to 5¾; Grenville, 3¼ to 3¾; Peevor, 9¼ to 9¾; Mellanean, 3½ to 3¾; Marke Valley, 12s. 6d. to 15s.; Parys Mountain, 10s. to 12s. 6d.; West Tolgus, 26 to 28; Devon Great Consols, 2 to 2¼.

MR. WILLIAM H. H. WATSON begs to offer his advice and services to Shareholders and Intending Investors in Mines, and in the Purchase and Sale of Shares.
Address: W. H. H. WATSON, 1, ST. MICHAEL'S ALLEY, CORNHILL, LONDON, E.C.

THE WEEK.

SATURDAY, APRIL 5.—The shares of the Oriental Bank Corporation were pressed for sale from the opening, being dealt in first thing at 17⅛, the price the previous evening being 19 to 20; the closing price was 17⅛ to 18⅜. The Port Phillip Company for the month ending March 26 announce a profit of 1067*l.* Shares are firm at 9s. to 11s.; Colorado, 1⅞ to 2⅛; Richmond, 8¾ to 8⅞; Eberhardt, 4⅛ to 2¾; Devon Consols, 2⅛ to 2⅜; Leadhills, 2¼ to 2⅛; Frontino, 2⅝ to 2¾. Erie Second Mortgage certificates have now reached 70*l.*

MONDAY.—Unified reached 48¾ early in the morning, but was pressed for sale the rest of the day until 47¼ was reached. When business was over it was known that the Khedive had dismissed Rivers Wilson and his French *confrère*; no doubt this was known as likely to take place to a select few, hence the early selling. Great Eastern touched 56. Erie Second Mortgage advanced to 71. The coupon bonds and the First Mortgage have not as yet had a proportionate rise. Oriental Bank shares fell 10s. further, to 17, 18.

TUESDAY.—Egyptian Unified and Preference opened 1¼ lower, at 45¾ and 69¾ respectively. At one time in the day each recovered ½ per cent., but finally only closed a quarter above the lowest. There was an active market for mining shares, for tin especially. Many seem sanguine of a still further important advance in the price of the metal. Several promising mines that were hastily shut down are now likely to go to work again. Carn Brea and Dolcoath were quoted 1¼ higher. West Chiverton shares met with some demand, and advanced to 2*l*. Roman Gravels and one or two others rose ¼. The telegram from the

Richmond Mine speaks of the mine still looking well. Shares are now over 9. Eberhardt approached 5, then, as is frequently the case, were offered and fell to 4½.

WEDNESDAY.—Until the present year the lowest price touched by the Oriental Bank Corporation shares within recent time was 28, the highest in the same period being 46. At the close of to-day the price was nearly 50 per cent. below the lowest. But for the shares carrying a further liability of 25*l.* each there would not have been so heavy a depreciation. They left off no better than 14 to 15.

THURSDAY.—It is worth noting that with regard to Chilian Bonds that for some time past, although the dealers for their own protection make 4*l.* per cent. margin, there are sellers who are willing to take anything above the lowest price. While the 7 per cents. have been quoted 74, 78, holders have been realising at 74, or taking 51 for the 5 per cent. when quoted 50, 54. No such prices as these have ever been reached before. At the commencement of the year the 7 per cents. were worth 92, and the others 64, but in the previous year they were selling at 105 and 85 respectively.

Mining Correspondence.

BRITISH MINES.

ABERLLYN.—John Roberts, April 9: The lode in the forebreast in driving north in the No. 2 adit is much the same in value for blende as it has been; the lode is harder, and contains more quartz. The other part of the lode in cutting through behind the end is not altogether so good, there being more of the hard shale mixed up with it, but still it is a good lode. In cutting through the lode in the bottom of the level at the top of the rise it looks very well, and contains a great deal of almost solid blende. At surface we are closing up our work as fast as possible, and I hope by the end of next week to try the machinery.

BETTWS-Y-COED.—H. T. Haley, April 9: In the deep adit cross-cut we have this morning intersected the lode, and from what I can see it is of the most favourable character, composed of lime, spar, prian, and good lead, but is not sufficiently opened on to give its value. In the winze sinking below the shallow adit the lode is 4 ft. wide, orey throughout, producing 25 cwts. of lead per fathom. The lode in the 20 going east continues to open out valuable ground for stoping, and is easier for driving. We have connected the rods from the engine-shaft to the water-wheel, which, with the rods and pitwork in shaft, are working as well as we could wish, and we hope quickly to get the water out, so as to clean up the shaft and get in full course of sinking. The engine will be ready for starting by the end of next week, and, as the levels are full of good work, will commence to draw as quickly as possible. We are getting on as fast as possible with the dressing and all surface work.

BLUE HILLS.—S. Bennetts, P. Vian, April 5: The north lode in the 30 east end is somewhat improved during the past week, and at present is worth 5*l.* to 6*l.* per fathom. The stopes in the back of this level are worth 8*l.* and 10*l.* per fathom respectively. In the Blue Burrow shaft a small lode, 6 to 8 in. wide, is producing saving work, and is probably some 8 to 10 ft. north of the main part of the lode on which the end is being driven.

BODIDRIS.—H. Hotchkiss, April 10: Maes-y-pwll Lode: The ore-bearing part of this lode keeps much the same in character and size, and will produce lead ore in quantity and quality as last week. We are driving east and west upon it, but at present the western end is the richest for ore, although the character of the lode in the eastern side is equally as promising, and will, I believe, become the best in time. We had a stems drawing of leadstuff to land yesterday from the lode, and it looks very well. I hope to have another early in the next week. The lode in the 45 east keeps much the same direction, and is of a very promising character, being spotted with lead ore and a beautiful mineral limestone on either side. There is a sound here as if we are approaching some hollow place, but which I think is an indication of our near approach to the Craigiog lode. Progress in sinking the main engine-shaft is rather slow, owing to the hard nature of the ground.

BWLCH UNITED.—Nicholas Bray, April 5: During the month the month the shaft has been sunk 5 ft., and had it not been for exceedingly severe weather, which stopped the wheels, it would have been down to the required depth for a 100 fathom level; its present depth is 9 fms. 4 ft. below the 90, and I am pleased to say that the water was got out and sinking resumed on Wednesday last. The rise in the back of the 70 is up 2 fms.; the lode is 3 to 4 ft. wide, very encouraging, and carrying a mixture 2 ft. in width of good orey stuff; owing to a want of ventilation for six men to work to advantage I have removed them to cut windlass room to sink a winze from the 60 towards the rise, and others to timber a breakdown at the 40 fathom level in the old mine, to secure the water outlet into Goginan Mine, which has been rather a tedious work. The season is so far advanced that we may now expect and hope to be able to work with regularity.

CLEMENTINA.—John Roberts, William Sandoe, April 9: The water-wheel is progressing favourably with its erection. All the segments on one side are in their place, and in another week we shall get in the other side. We have fixed the cistern at the 15, which is ready to take the pumps, which we expect to arrive to morrow. In the meantime we are putting down the main rods in the shaft, so that no time may be lost. We are dressing up the pile of lead for market, which is yielding very well.

COMBMARTIN.—T. Comer, April 9: The caunter lode in the north-west end adit level continues of much the same nature as when last reported; the lode is still large, composed principally of quartz and killas, with good stones of lead ore and blende. In the adit, driving east of cross-cut, we have not reached the footwall of the caunter yet, and so far as cut into the lodes show no sign of improvement at the junction; the lodes at this point are principally killas and small seams of mundic. We calculate to get through to the footwall by the end of next week, when we hope to meet with something more cheering; the ground in the adit cross-cut is of much the same character as for the past few weeks.

CWMYSTWITH.—April 9: Since the favourable change in the weather No. 1 winze below Gills' upper level, on new lode, has been sunk by rock-drill, by six men and three boys, and very good progress made considering the increased quantity of water. As we get deeper this difficulty, we hope, will be overcome as soon as the lode is cut in the 15 fm. level cross-cut. The lode in the winze is 3 ft. wide, and worth 1¼ ton of lead ore per fathom. The lode in No. 2 winze sinking below Gills' upper level, on the new lode, is 5 ft. wide, composed of lead and blende—saving work; ground a little more favourable for sinking. In the 15 fm. level cross-cut north at Pugh's engine-shaft no change has taken place since our last report; ground still favourable for driving. In Gills' cross-cut driving north we are again in clean ground, and the end quite dry, and is, according to dialling, about where the new lode should be reached; therefore, we may cut the main part of the lode any day. The lode in the stope over Gills' upper level, in the new lode, is 3 ft. wide, and worth 1 ton of lead ore per fathom. The lode in the three stopes over Michells's level is worth 1 ton of lead ore per fathom. The stope over Level Fawr, on the copper lode, is producing fair quality stuff, and if the price of lead ore continues to improve we purpose putting in another four men in this stope, as another of our pitches has become poor, and will have to be suspended until we can give more tribute. The other pitches are producing their usual quantity of lead. We are pleased to say that the water in the shaft is again below any of our workings, and that the men are again all at work. Our water-wheels are in good repair, and working well, also all our dressing machinery in full work, with a good supply of water. Samples of 60 tons of lead ore were sent out on the 1st inst. for sale on the 15th.

D'ERESBY CONSOLS.—J. Roberts, W. Sandoe, April 9: We have no change here to speak of. We may now at any moment strike the Cobbler's lode; it is difficult to say the exact distance to drive, as in a distance of 30 fms.—from surface to that point—we cannot say how the lode may underlie.

D'ERESBY MOUNTAIN.—J. Roberts, W. Sandoe, April 9: The No. 1 Adit: The lode here is much the same as it was last week, only better—a nice looking lode. The No. 2 end has improved; the containing rock is much better for producing lead in the lode, and the lode itself is for about 1 ft. in width a nice mixture of lead and blende. The winze in No. 2 is now getting so near to the rise that the men can be heard shouting one to another, and in a few days we hope to have a communication; the lode in both places is much the same.—The Stope at No. 4: The men here when not blasting up the rocks for the trammers are working on the stope at the south end, which contains good branches of lead. At the Gorse shaft we have got the engine and winding gear all ready for working, but we found that the crank shaft of the engine had been bent on some former occasion, and we were obliged to send it to the foundry to get it straightened, which has caused some days delay. We hope, however, early next week we shall make a good start. At No. 5 we have cleared 6 fathoms this week, and we hope to do the same next. The dressing goes on regularly. The house over the ore bin is in a forward state of erection.

EAST DARREN.—April 9: In the 104 cross-cut south, opposite Taylor's shaft, a branch or part of lode has been passed through 2½ ft. wide, containing small branches of ore, saving work for dressing, and the end is being pushed forward to reach the south lode. In the 92, east of cross-cut, on the south lode, the lode is 4 ft. wide, showing small strings of ore, and improving in appearance. In the same level west the lode is small and poor, and we are at present driving towards the south part of the lode to prove if it is productive. In the 92, east of the cross-cut, on No. 2 branch, the lode is 4 ft. wide, carrying a rib of ore on the hanging-wall, worth 10 cwts. per fathom. In the 80, west of cross cut, on the south lode, the end is all in lode, composed of light clayslate, carbonate of lime, spots of copper, and branches of lead ore, yielding of the latter 15 cwts. per fathom. In the winze sinking under the 80, east of the cross-cut, on the junction, the lode is 3 ft. wide, a little improved, now yielding 18 cwts. of lead ore per fathom. The tribute pitches throughout the mine are without change to notice. The machinery is in good order, and drawing and dressing progressing favourably towards preparing ore for our next sampling.

EAST ROMAN GRAVELS.—Arthur Waters, April 9: The 86, to drive south of shaft, by four men, at 8*l.* per fathom; lode 5 ft. wide, and worth 1¼ ton of lead ore per fathom. The No. 1 pitch in the back of the 75, south of shaft, by two men, at 2*l.* 10s. per ton. No. 2 pitch in the back of 75, south of shaft, by two men, 4*l.* 15s. per ton. The pitch in the bottom of the 63, south of shaft, by four men, at 4*l.* 10s. per ton. The pitch in the bottom of the 50, south of shaft, by four men, at 4*l.* 4s. per ton. A pitch in the back of the 50, south of shaft, by four men, at 8*l.* per ton. A pitch in the bottom of the 40, north of shaft, by two men, at 5*l.* per ton. No. 1 pitch in the bottom of the 20, south of shaft, by two men, at 5*l.* 10s. per ton. No. 2 pitch in the bottom of the 20, south of shaft, by two men, at 8*l.* per ton. The tributers have to pay all costs, including 20s. per ton for dressing. We shall sample 30 tons of lead ore to-morrow (Thursday), for sale on the 17th instant.

EAST VAN.—W. Williams, April 9: I have nothing fresh to report from here, We are pushing forward the level east as rapidly as possible.

GAWTON COPPER.—George Rowe, George Rowe, jun., April 5: The lode in the 117, west of cross cut, is 5 ft. wide, producing capel, spar, and mundic, mixed with good quality copper ore, of a very kindly appearance. The lode in the 105, west of cross cut, is improving in character, yielding 2 tons of ore per fathom. The lode in the stopes between the 105, east of winze, is worth 15*l.* per fathom. No. 2 stopes, in the bottom of the same level, west of said winze, are worth 9*l.* per fathom. The lode in the stopes in the back of the 105 is worth 8*l.* per fathom. All other points are without change.

GLENROY.—R. Rowe, April 5: Since the meeting in December the severe frost and snow caused us several small breakages and hindrances in the sinking of the shaft, which by measurement is 97½ fms. from surface. The shaftmen when unable to get to work in the bottom have been employed in driving the 25 cross-cut west, and which has been driven several fathoms, and intersected a wide run of strongly mineralised strings and branches, and would indicate a lode further ahead, but it has only been followed up when the men have not been able from water to work in the bottom. Further, the shaft has been timbered and sheathed for drawing, and ladder-road fixed from the 80 down to the bottom, and at that point a small lodge cut since the meeting. Nothing further is now wanted till we are deep enough with our present pumps to drive out levels, and the winter being over (which for frost and snow has been an unparalleled one), I expect we can make rapid progress, barring accident, in the next three months' sinking, when I would recommend to drive levels out north and south on the lode, which in the present bottom is beyond the width of the shaft (7 to 8 feet); and although it has not yet changed for the better to any appreciable extent, it has of late shown more promise than usual, and there is now in the bottom a more genial quartz, with a little lead and blende, beyond anything we have seen for some months past.

GOGINAN.—April 9: There is no change worthy of remark in the pitches since my last report. We have now got fine weather, and the dressing of the halvans is being proceeded with regularly. Samples of 29 tons of silver lead ore were sent out on April 1 for sale next Tuesday.

GREAT RETALLACK.—J. Harris, April 7: In driving west of cross-cut from boundary shaft we have communicated with the old workings as I expected, and I see an end of ground left by the former workers for about 3 fms. high from the present depth, where there is a leader of blende on the footwall about 1 ft. wide, which I calculate will produce from 1½ to 2 tons per fathom. As we cannot see any water in the old workings below the present depth I have put the men to uncover the shaft again to see how the water stands in it, as I did not expect to meet with water as we did in sinking the shaft. The present level is about 2½ fms. above the bottom of the shaft, so if the shaft be dry we shall be able to sink a little deeper to get down to the 40, when we shall be able to command the ground for tribute purposes.

GREEN HURTH.—W. Vipond, April, 4: The end north, on No. 1, in the 30, is still yielding 5 tons of ore per fathom. The end south has improved, and I should think it will yield from 12 to 14 tons of ore per fathom; in fact, it can scarcely be estimated as it stands. To-day it is more like a quarry of ore than anything else. We finished the delivery of a wagon of ore yesterday, 8 tons, the fourth this year, and we shall have another ready by to morrow, 8 tons.

GREEN HURTH.—Wm. Vipond, April 9: The end sonth, in the 30, on No. 1 vein, continues as good as ever—12 to 14 tons per fathom; in fact, I do not see how we can have any further improvement considering the size of the end. The end north is improving, yielding 6 tons of ore per fathom at present, with the timber at the bottom of the level resting upon a mass of solid lead ore. We finish the delivery of the sixth wagon of ore to-day, containing 7 tons 16 cwts. each.

HERODSFOOT.—P. Temby, April 9: The ground in the 205 end south is improved for driving. The lode here and in the three stopes is yielding about the same quantity of lead as last reported. The lode in the 190 end north is fully 3½ ft. wide, yielding a little more lead. The north end of the rise over the 160 is to-day communicated with some old workings, which appear to be a sink from the 147. The rise is now 10 fms. above the 160 cross-cut. Two pares of tributers have taken two more pitches at the 80 and 147.

LADYWELL.—Arthur Waters, April 9: The new south shaft is now 11 fms. below the 16. The lode in the 16 south has been twitched up for days past, but seems to-day to be opening out again. The stope in the roof of this level is worth 2 tons lead ore per fathom. The 32 is now 5½ fms. south of Webster's winze. We can now see the commencement of the ore course discovered in the level above, and hope to have said end (the 32) up to it, and the ground secured, by Tuesday next. No other change in the mine worthy of remark.

LEAD ERA.—J. A. Ede, April 7: On Friday we formed a communication between No. 1 and the adit, so that by this we have extended the adit level 50 fms. in the direction of the lodes, the finest of which we are rapidly approaching, so that I anticipate before long being in a position to forward you some cheering news from this quarter of your property. The north and south lode maintains its size and lithological qualities, and continues to influence the surrounding strata in the manner I observed in former reports, carbonate of lime predominated as an associate. No. 2 shaft set on Saturday, the 29th ult., for 20 yards, at 12*l.* 15s; sunk 37 ft. The flat is much deeper here than at the first shaft, as we are sinking on a furrow, which, as I have before explained, is a characteristic feature attending the deposits of ore in these measures.

MEDLYN MOOR.—Joseph Prisk, Charles Rowe, April 9: The ground in the north cross-cut is moderately easy for driving, and requires but little timber; we have this week cleared up some old men's works about 100 fms. west of our present working, which has enabled us to take the underlie and the direction of the lode, and from the dialing we have about from 6 to 8 fms. more to drive; this would have been done before, but we have had difficulty in getting permission to enter the enclosed lands. In the gunnis we are clearing we find some rich stones of tin in the debris, but the lode so deep as we are gone is all taken away. The cross cut is being pushed on with eight men and two boys at the rate of 3 fms per week.

MELLANEAR COPPER.—John Gilbert, April 9: The lode in the 30, west of Gundry's shaft, is 1½ ft. wide, and worth 1 ton of copper ore per fathom. The lode in the 40, west of shaft, is 2 ft. wide, and producing a little saving work for copper ore. The lode in the 60, west of shaft, on the south-east part, is still worth 4 tons of ore per fathom. The lode in the 60, west of shaft, on the north part of the lode, is worth 1½ ton of ore per fathom. The lode in the 70, west of shaft, is 2½ ft. wide, and worth 1 ton of ore per fathom. The rise in the back of this level is worth 3 tons of ore per fathom. The lode in the 80, west of shaft, is 4 ft. wide, and worth 2 tons of ore per fathom. The lode in the 90, west of shaft, is 4 ft. wide, and worth 2 tons of ore per fathom. The winze in the bottom of this level is worth 2½ tons of ore per fathom; this winze is down about 9 fathoms, and has been in a good lode for the whole distance. The lode in the 100, west of shaft, is 4 ft. wide, and worth fully 2 tons of ore per fathom, and looking very promising to improve. The lode in the 100, east of shaft, is 3 feet wide, and worth 1 ton of ore per fathom. The shaftmen have resumed the sinking of Gundry's shaft below the 100 by nine men; the ground is favourable for sinking, and we expect to make rapid progress in getting this lift down to the 110.—Skip Shaft: The ground is still very good for driving in the 70 cross-cut, south of shaft, and the men are making good progress, doing nearly 2 fathoms a week. The men have cut through the cross-course in the 100, and we have broken some very good stones of ore from a branch on the western side, but the lode has been heaved south in all the upper levels, and we calculate that we have about 3 fathoms to drive in that direction to intersect the main part of the lode. There is no other change to notice in any of our operations. We estimate our sampling for next Tuesday to be about 600 tons of copper ore.

MINERAL CORPORATION OF GREAT BRITAIN.—William Bennetts, April 9: HAFNA AND HIGH HAFNA MINES: No. 3 Adit: The men are making fair progress in driving, and I am pleased to say that the blende appears to be giving place to lead. We have more lead in the end to-day than I have ever seen there before, which speaks well for No. 3 level.—Surface: The works are progressing satisfactorily. The smith and carpenter are busily engaged in making the jiggers, &c. We are also getting on very well with the embankments and reservoir, which we hope to have completed by next Saturday fortnight.

GREAT D'ERESBY MINE.—The smith's shop will be covered in and completed by Saturday next.

BRYN CANADON MINE.—The men are still engaged in clearing the old workings.

MONYDD GORDDU.—J. G. Green, April 9: As under, I beg to hand you the setting list for the two months ending June 6:—The 34 to drive west, to six men, at 95s. per fathom; takers to clear their stuff back to lodge. The end is extended 17½ fms. from the cross-cut, and I calculate we shall be far enough to catch line of junction during the present month; worth at present 10 cwts. per fathom. To sink a winze below the 24, to six men, 3 fms., stent for 26*l.*; worth 1 ton of lead per fathom. It is sunk 7 fms., and the 3 fms. now set will make it deep enough for the 34. To drive the 24 east on cross branch, to two men, at 5*l.* per fathom; producing stones of ore, and I am anxious to see what can be discovered in this direction (east), as most of the ore so far is found west. To drive the 34 east, to two men, at 90s. per fathom; the lode, as you are aware, at this point, is 9 to 10 fms. wide, and I have set these two men to drive on what I consider is the most promising part of it. There is no ore at present in the drive. To drive the 12 west, to six men, 2 fms. stent, at 6*l.* 10s. per fathom. This end has improved in character very much lately, being compact and full of small vughs or fissures, containing crystals of quartz and lead ore; saving work for the floors. The importance of a good discovery at this point will be readily understood, as it will not only open ground for stoping, but prove that the ore is not confined to one bunch or course in the lode. There is about 20 fms. to drive to come under a trial pit we sank on the back of the lode last summer, in which we found good stones of lead and blende. The total distance from Burnett's engine-shaft to the Elgar boundary is 200 fms. To stope in the back of the 24 on junction, to 10 men, for the whole width (2 fms.), at 8*l.* per fathom single measure; the lode is worth 1 ton per fathom. To tram and fill all the stuff into ships, to three men, at 4s. 3d. per score skiploads. On the whole the mine is looking well, and no time should be lost in sinking 15 or 20 fms. We got the crusher repaired and roller-shells changed last night, and have commenced crushing again this morning. All the machinery is working capitally.

NORTH TRESKERBY.—M. George, April 10: The ground in the engine-shaft is improving; we are making good progress in sinking, and expect to be down and driving the 38 by the end of this month. The lode in the 24, driving west of engine-shaft, is 4 ft. wide, and worth 1½ ton of copper ore per fathom, and is likely from present appearance to further improve. The lode in the 12, driving west of cross-course, is 4 ft. wide, yielding ½ ton of copper ore per fathom. The lode in the winze sinking below the 12 is 3 ft. wide, yielding 1½ ton of copper ore per fathom. The lode in the rise in the back of the shallow level is 3 ft. wide, yielding 1¼ ton of copper ore per fathom. We shall sample about 26 tons of copper ore on Tuesday next. Our prospects, on the whole, are improved.

PATELEY BRIDGE.—C. Williams, April 9: There is no change in the mine to report this week. We are pushing forward the erection of the new machinery as much as possible, and good progress is being made.

PATTER SYKE (Lead).—John Peart, April 8: This mine is situated in the manor of Tynehead, in Alston Moor, Cumberland, close to the main road between Alston and Middleton in Teesdale. It is about twelve months since we commenced to drive a new horse level, and we have cut the Clargill Head north and south vein, and in it have met with some very good ore. I may say that before starting this new level we put down three shafts from the surface, and found very nice ore in all of them. We are now driving the said level in this vein southward—in the direction of the said shafts—and have got some pieces of solid ore 6 and 8 stones weight. Since we cut the vein about five months ago we have worked between 50 and 60 bings, and have now ready for market 50 bings of very good ore, which will contain about 30 ozs. of silver to the ton of lead, the richest silver ore in the district, and the workings at present are looking well, and likely to be productive. By continuing this level south in the Clargill Head vein it will intersect five or six east and west veins, all of which have raised a considerable quantity of lead ore a short distance westward, and each vein of itself may prove to be a rich mine, as they did on the west side of the hill. And having a good vein like the Clargill Head vein to drive in may raise sufficient ore to pay all expenses in driving up to the different intersections, so that really it may not cost the company anything to prove them, but from present appearance may pay dividends. We have a low level already driven over 200 fathoms, and is now standing in an east and west vein that has raised over 200 bings since this level cut it, and if continued eastward in this vein 150 or 200 fathoms will cut the Clargill Head vein, and also the Green Hurth vein if the latter keeps its present point, which is the richest mine in the district at the present time, some 20 fathoms deeper than our top level, and will thoroughly lay open these and all the other veins in depth, and by continuing this low level other 25 fathoms east will lay open another rich vein, known as Sir John's vein, which has been worked in the adjoining mines—Clargill Head, Stow Cragg, and Lee House Well—and produced several hundred tons of lead and copper ores. This is one of the best trials in the district, and may require very little capital to explore it, being well situated, having a low level already driven over 200 fathoms, and in good order, all laid with iron rails, so that no machinery for pumping, &c., would be required. In conclusion, I may say that in this ground we have no less than twelve veins, all of which have produced lead ore in the adjoining mines, and can be explored by water levels. A plot of mining ground with such a variety of veins, intersecting each other at different points, is seldom to be met with.

PENHALLS.—S. Bennetts, P. Vian, April 5: The top lode is not yet cut in the 70 east end. The stopes in the back of this level are worth 10*l.* and 12*l.* per fathom respectively. A winze below the 20, on a flat lode at the flat-rod shaft, is producing some tinstuff, and of a promising character. A winze below the 30, on the same lode further east, is also producing a little tin, but not sufficient to value.

PENSTRUTHAL.—W. Polkinghorne, April 9: In the 34, driving east of Highburrow shaft, the lode is 5 ft. wide, and worth for tin about 10*l.* per fathom. The winze sinking in the bottom of the 4, east of Highburrow shaft, is worth fully 20*l.* per fathom for tin. The pitches in the back of the 72 and bottom of the 58, west of Highburrow shaft, have improved during the past week for copper ore.

PRINCE OF WALES.—John Andrews, April 9: The tributers both at the Valley and Vigar's shafts are raising a moderate quantity of arsenical mundic, but at the present time they are doing but little on the silver lode.

ROMAN GRAVELS.—A. Waters, April 9: The mine throughout is looking well for the future, the yield of the various ends and stopes being equal to valuation given in the general reports. We sold 100 tons of lead ore on Saturday last for 983*l.* 15s., and sampled 200 tons on Monday for sale on Saturday.

ROOKHOPE.—T. Tonkin, April 9: The adit level has become much harder within the past week, but is still good for ore; we are now past the old excavations, and well into the side vein, which is the cause of the increased hardness: the ground is worth about 20 cwts. of lead ore per fathom. In the drivages in the 15, east and west on the side vein in cross-cut near Low shaft, the yield of ore averages 8 cwts. per fathom, including the carbonate of lead, as well as the sulphide produced here; the ground remains moderately easy. We are getting some good stones of ore from the back of this level near Gin shaft, and will soon be in shape for producing some fair work which is already in sight. We are now rising above the 25 with a view of making a communication with the workings in the 15, and so opening up the ground for stoping away the side vein between these two levels; the ground in the rise is at present hard, but looks well for ore, being worth 10 cwts. per fathom. In the level beneath where we also cross-cutting into the side vein we have a like favourable appearance, and the ground is worth 10 cwts. per fathom. There is no change to notice in the character of the ground at the pump sump; it is still stiff, and only worth about 8 cwts. of lead ore per fathom. In the stopes in the 42, near Low shaft, the ground does not produce at present above 8 cwts. per fathom, but we are not at present engaged in the best part of the ground. In the stopes near Gin shaft we are getting work worth 8 cwts. per fathom, and the ground is very easy, and would require much timber, but that we fill up as we go, after removing the ore from a given length. I have two hands rising from the 42 on the main vein near to Low shaft, which, when completed, will greatly facilitate the working of the ore ground in this part of the mine.—Dressing Operations: We are gradually getting over the check we received from the severe weather of the week before last, and are now in a position for treating as much ore as our capabilities underground will admit. The machinery is in good working order.

SOUTH CAMBRIAN.—A. Williams, April 9: The lode in the adit level driving east during the past fortnight has fully maintained its value—3 tons of blende per fathom—and has a charming appearance in the present end, and is letting out more water than usual. In stripping the lode below shaft we have a strong and masterly lode, composed of quartz, carbonate of lime and spar, and blende ore. We have cut about 9 ft. into it at this place, but there is no indication as yet of being through to the north side. The last layer taken down is very vughy, and has every appearance of a rich lode.

SOUTH DARREN.—Henry James, April 9: I have to day carefully examined all the underground workings. The sinking of the shaft is progressing well, and the lode still holds its favourable appearance for a good discovery. The 100 east and west from winze is not in fork yet, owing to the scarcity of water for the pumping-wheel by night; the water is now down within 3 ft. of the sole of the level, so it will soon be out. The lode in the 90 end is looking well; we tried a blast or two in it close to the end this morning, and from the stuff broken I think it will maintain its former value—from 30*l.* to 35*l.* per fathom when taken down. No. 1 stope in the back of the 90 is worth 30*l.* per fathom. No. 2 stope is worth 16*l.* per fathom. No. 3 stope is worth 14*l.* per fathom. No. 1 stope in back of the 80 is worth 28*l.* per fathom and No. 2 stope 15*l.* per fathom for lead and copper ores. All other points of operation are without change since last week. The drawing and dressing are being pushed on with all possible speed, but the water supply for the nightwork has been rather short this week. The 45 tons of silver-lead ore sold last Friday realised 689*l.* 12s 6d.

SOUTH MOLTON CONSOLS.—T. Harris, T. May, April 5: We have to-day reset the adit level to drive east, by six men, at 7*l.* per fathom the month; the ground is a stiff dark blue killas, but we are hoping that another 3 fathoms driving will get us through this belt of hard ground into a more congenial channel, where we hope to make better speed in our drivage.

TANKERVILLE.—Arthur Waters, April 9: Watson's engine shaft is now down 13 fms. below the 208. The 206 east is now 29½ fms. from shaft; the lode in the present end is 6 ft. wide, worth 3 tons of lead ore per fathom. The same level is driven 18 fms. 2 ft. west of shaft; the lode in the present end is very wet, 3 ft. wide, worth ½ ton per fm. There are eight stopes in the back of the 206, east and west of shaft, worth together about 12 tons of lead ore per fathom. Other points throughout the mine as last reported. The tribute pitches are yielding the usual quantities of lead ore. We shall sample 80 tons No. 1 quality and 20 tons No. 2 quality lead ore to-morrow, for sale on April 17.

TEESDALE.—J. Slack, April 3: The west end forehead looked better, and contained more lead ore than it has ever had in it before; it becomes more mineral like as we get forward. It will carry fully six bings lead ore per fathom as it looks at present. In the west end stope there is more lead ore than I have ever seen; it is more concentrated into a body, and is worth 12 to 14 bings of lead ore per fm. I have placed six men in this working at 50s. per fathom. We have sent 35 bings of lead ore to market this month.

VAUGHAN.—April 9: In the 30, west of stope, the lode is hard for exploring, being composed of blue clay-slate, carbonate of lime, beds of grit, and a mixture of lead ore. In the stope over this level the lode is large, yielding on an average from 15 to 18 cwts. of lead ore per fathom. The dressing machinery is in good working order, and steadily at work. We shall sample on Tuesday next 15 tons of silver-lead ore.

WHEAL CREBOR.—John Andrews, April 8: In the 120 east we are driving by the side of the lode. The lode in the stope in the back of the 120 is 3 ft. wide, and worth 8*l.* per fathom. The lode in the 108 fm. level east is 5 ft. wide, and worth 12*l.* per fathom. The lode in the winze in the bottom of the 108 is 6 ft. wide, and worth 10*l.* per fathom. The ground in the rise in the back of the 48 going up against the new shaft is favourable for progress. There is no change in the new shaft, and no lode has been taken down for the week.

WHEAL GRENVILLE.—T. Hodge, April 9: Goold's Shaft: In the 165 east end we have taken down about 3 ft. of the leader part of the flat lode, which is worth 8*l.* per fathom. The 165 west end produces stamping work; this end looks likely to improve soon. The stope in the back of the 150 east is worth 9*l.* per fathom. The 150 east end is worth 10*l.* per fathom. The winze sinking below the 140 east is worth 10*l.* per fathom. The lode in the 140 east end is disordered by a patch of elvan.

WHEAL UNY.—William Rich, Matthew Rogers, April 7: We intend to resume driving the 160 end west next week, and to suspend the rise in the back of this level till the end of the 150 is driven forth to it. We have cut several branches in the 150 cross cut north, but no lode of importance has been met with. We have, therefore, suspended the cross cut referred to. The 160 end, east of Goding's shaft, yields stones of tin. The 130 end west is worth 7*l.* per fathom. The 130 end east is worth 6*l.* per fathom.

OLD TINCROFT CONSOLS.—At the Court of the Vice-Warden of the Stannaries, held in London on March 24, applications were made by Mr. G. STILL, the voluntary liquidator, to recover various sums alleged by the said liquidator to have been wrongfully paid to the late managing director, Mr. Reynolds (on account of an admitted claim), by his colleagues, and the legal proceedings were against such directors. Individually as against Mr. Reynolds an application was made by the liquidator to enforce the delivery up of certain documents, &c., stated by him to be in the possession of Mr. Reynolds. On the part of various merchant creditors a petition was presented objecting to the legal proceedings referred to as taken by the liquidator, and praying for a compulsory wind-up by the Court. The motions were argued at considerable length. Mr. Woodroff, instructed by Mr. Stacpoole, appeared for Mr. Reynolds, and other eminent counsel, instructed by Mr. Pettengill, for the voluntary liquidator. The creditors were also represented by counsel. The motion as against Mr. Reynolds personally with regard to documents, &c., was dismissed with costs. The motions as to the various sums of money alleged to have been wrongfully paid were not granted, and the consideration of the question of costs with reference thereto was adjourned. Mr. Reynolds, as a large creditor, supported the petition to the Court for compulsory wind-up, which was strongly opposed by the liquidator. The petition was, however, granted, and the voluntary liquidator was called upon to undertake to hand over all books, papers, and documents to the newly appointed authority who supersedes him.

CORNISH PUMPING ENGINES.—The number of pumping-engines reported for February is 16. They have consumed 2235 tons of coal, and lifted 17·4 million tons of water 10 fms. high. The average duty of the whole is, therefore, 52,500,000 lbs. lifted 1 ft. high, by the consumption of 112 lbs. of coal. The following engines have exceeded the average duty:—

Mellanear—76 in.	Millions	53·2
Mellanear—Gundry's 80 in.	...	53·3
West Basset—Thomas's 60 in.	...	53·8
West Wheal Frances—58 in.	...	59·5
West Tolgus—Richard's 70 in.	...	58·1
West Wheal Seton—Harvey's 85 in.	...	71·9
West Wheal Seton—Rule's 70 in.	...	63·1

EPPS'S COCOA.—GRATEFUL AND COMFORTING.—"By a thorough knowledge of the natural laws which govern the operations of digestion and nutrition, and by a careful application of the fine properties of well-selected cocoa, Mr. Epps has provided our breakfast tables with a delicately flavoured beverage which may save us many heavy doctors' bills. It is by the judicious use of such articles of diet that a constitution may be gradually built up until strong enough to resist every tendency to disease. Hundreds of subtle maladies are floating around us ready to attack wherever there is a weak point. We may escape many a fatal shaft by keeping ourselves well fortified with pure blood and a properly nourished frame."—*Civil Service Gazette.* Sold only in packets labelled—"JAMES EPPS and Co., Homœopathic chemists, London."

*** With this week's Journal a SUPPLEMENTAL SHEET is given, which contains—Original Correspondence: Reducing Sulphide Ores Without Fuel—Hollway Process (G. Gatheral); Reducing Sulphides Without Fuel (H. M Howe); Lighting Collieries (J. D. Shakespear); Shot Firing by Electricity (J. Barkell); Colliery Management (B. Pickard); Birmingham, and its Supply of Coal; New Silver Extracting Process; Is it Right to Pay any Purchase Money for Mines (H. D. Horkold); Lake Superior Mining (W. W. Stuart); the Wynaad (India) Gold Fields; British Trade with Spain; Tharsis Copper Company; Don Pedro North del Rey Mining Company; Flagstaff Silver Mining Company of Utah (A. A. de Metz) Flagstaff Company (G. W. Bacon); Colorado and Flagstaff: Coating Iron with Irridescent Copper; Herodsfoot Mine (H. Waddington); Welsh Granite Quarries (H. J. Richardson); the Cambrian Mining Company (J. R. Anderson); Mines and Mining in Cardiganshire: Morfa du Mine (Limited); Monydd Gorddu—its Management, &c. (A. Francis); Captain Southey, of Wheal Jane and the Chivertons—the Scotch Mining Share Market, Weekly Report and List of Prices—Foreign Mining and Metallurgy—Meetings of Public Companies: Great Laxey, Clementina, Linares, Alamillos, Fortuna, and Cotton Powder—Registration of New Companies—Foreign Mines—Australian Mines—Direct Acting Air Compressor—Commercial Industry in Cornwall—Brickworks—Improved Steam Pumps—Electrical Metallurgy—Atomic Silver.

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The Mining Market: Prices of Metals, Ores, &c.

METAL MARKET—LONDON, APRIL 10, 1879.

IRON.	£ s. d.	£ s. d.
Pig, GMB, f.o.b., Clyde..	2 3 6-	—
,, Scotch, all No. 1 ...	2 4 0-	3 5 0
Bars, Welsh, f.o.b. Wales	4 15 0-	5 0 0
,, ,, in London.	5 2 6-	5 7 6
,, Stafford., ,, .	6 5 0-	7 0 0
,, in Tyne or Tees ...	5 5 0-	5 10 0
,, Swedish, London ..	8 15 0-	9 0 0
Rails, Welsh, at works..	4 15 0-	—
Sheets, Staff., in London	7 15 0-	8 5 0
Plates, ship., in London	5 12 6-	—
Hoops, Staff.	6 15 0-	7 5 0
Nail rods, Staff. in Lon.	5 15 0-	6 5 0
STEEL.		
English, spring 13	10 0-19	0 0
,, cast 30	0 0-40	0 0
Swedish, keg.....14	0 0-	—
,, fag. ham. 15	0 0-	—
LEAD.		
English, pig, common...14	15 0-	—
,, ,, L.B.....15	5 0-	—
,, ,, W.B. 15	10 0-	—
,, sheet and bar..16	0 0-	—
,, pipe.....16	10 0-	—
,, red 18	0 0-	—
,, white 25	0 0-	—
,, patent shot ...18	10 0-	—
Spanish 14	12 6-	—
NICKEL.		
Metal, per cwt 18	0 0-20	0 0
Ore, 10 per cent. per ton.24	0 0-26	0 0
QUICKSILVER.		
Flasks of 75 lbs., ware..	6 2 6-	—
SPELTER.		
Silesian	15 0 0-	15 5 0
English, Swansea	16 0 0-	—
Sheet zinc	19 10 0-	20 0 0

TIN.	£ s. d.	£ s. d.
English, ingot, f.o.b...	69 10 0-	70 0 0
,, bars ,, ...	71 0 0-	—
,, refined.....	72 0 0-	—
Australian	69 5 0-	—
Banca ..... (nom.)	72 0 0-	—
Straits	69 5 0-	—
COPPER.		
Tough cake and ingot.	62 0 0-	—
Best selected	62 10 0-	—
Sheets and sheathing .	67 0 0-	—
Flat Bottoms	70 0 0-	—
Wallaroo	64 10 0-	65 0 0
Burra, or P.C.C.	63 10 0-	—
Other brands	61 0 0-	62 0 0
Chili bars, g.o.b.....	57 5 0-	—
PHOSPHOR BRONZE.		
Bearing metal	£105	0 0
Other alloys £110	0 0-	125 0 0
BRASS.		
Wire	7 d.-	7½d.
Tubes.....	7¼ -	7½
Sheets	8 -	8¼
Yel. met. sheath. & sheets.	5½ -	5¾
Nails composition.....	7¼ -	—

TIN-PLATES.*	per box.	
Charcoal, 1st quality ...	1 1 6-	1 2 0
,, 2nd quality ...	1 0 0-	1 1 0
Coke, 1st quality	0 17 6-	0 18 6
,, 2nd quality	0 16 0-	0 17 0
Black .....per ton	16 0 0-	16 10 0
Canada, Staff. or Gla., at Liverpool	11 0 0-	12 0 0
Black Taggers, 450 of 14 × 10	30 0 0-	—

* At the works, 1s. to 1s. 6d. per box less for ordinary; 10s. per ton less for Canada; IX 6s. per box more than IC quoted above, and add 6s. for each X. Terne-plates 2s. per box below tin-plates of similar brands.

REMARKS.—Owing to the shortness of the week and the general disinclination on the part of buyers to operate, transactions have been of a more limited character, and the Easter vacation this year will doubtless be much appreciated by the various members of the metal trade, if it is only to obtain a few days relief from the monotony of business at the present time. There will be no 'Change held until Tuesday next, consequently no alteration will be made in the official rates, and most houses will not resume business again until that day. At the commencement of the week prices were quoted slightly higher for some metals, but subsequently a reaction took place, and a marked scarcity of buyers became observable, although to-day again they came forward more fully. The advices from Chili and Bolivia showing that war is progressing in those countries is chiefly what occasioned the better tone in our copper market, and if the hostilities which have broken out in these parts should be prolonged to any lengthened period there is every reason for supposing that copper will considerably advance in value, especially if producers are sensible in limiting their output, by which means a great reduction might take place in stocks and a greatly better price follow for some considerable time. The depreciation has been brought about by over-supply, and the only remedy left now is to act in the opposite tact. No improvement can permanently be effected in the market until its stability is ensured, and the quickest way to restore confidence will be by the publication of reduced statistics. The question of price rests with sellers, and according as they may increase or decrease imports, so the market will rise or fall. It is somewhat difficult to understand why sellers should so persistently continue to spoil their own market when by the exercise of judicious management they could so easily obtain a much higher figure for their produce. It always seems such suicidal policy on the part of any regular producers to overweight their market, and to adhere in that same course when it is so distinctly perceptible that the reduction in value does not stimulate the demand. Copper could as easily be sold at 20*l.* per ton above its present value as it is at ruling rates; 80*l.* per ton for Chili bars would by no means be a dear price, and a very few years since it was considered a remarkably cheap one. How people, therefore, can be found to sacrifice their property at the present low price is almost unaccountable but where there is one foolish person silly enough to do so it is often found that, like a flock of sheep, others follow in the same track. Nevertheless, sufficient time has transpired for reflection, and for stronger resolutions and wiser councils to prevail.

The producers of copper are very much to blame in sending forward such large quantities, and they ought at once to partly suspend operations at their works. A few months respite would give the relief needed to the market, and there would then be a fair chance of obtaining reasonable prices, and good profits on future supplies. The iron market shows but little change, and the demand keeps extremely limited. It was announced last Friday that Messrs. Bolckow, Vaughan, and Co had finally succeeded in making steel from Cleveland iron, and although it is much more advantageous to be able to obtain an article with so much more durability than iron possessed the fact should not be overlooked that these inventions, although to all appearance very serviceable, must soon cause a complete revolution in the iron trade, as steel will undoubtedly altogether supersede iron A fair business is reported to have been transacted on the warrant market at Glasgow betwixt 42s. 5½d. and 42s. 6d. for cash parcels, and 1d. to 1½d. above these prices one month, and the price to-day was advanced to 43s. 6d.

SHIPMENTS.

For the week ending April 5, 1879 ..... Tons	12,653
For the week ending April 6, 1878	7,448
Increase	5,205
Total increase for 1879	25,586
Imports of Middlesborough pig-iron into Grangemouth:—	
For the week ending April 5, 1879 ..... Tons	8,267
For the week ending April 6, 1878	6,806
Increase	1,461
Total decrease for 1879	8,936

FURNACES.

In blast April 5, 1879	90
In blast April 6, 1878	91

A further slight advance took place in the value of tin at the early part of the week, and spot tin has been extremely difficult to buy even at quoted rates, and to secure their requirements buyers have lately been compelled to pay on each successive transaction an advance upon previous quotations. The fact is that the principal of the stock is concentrated in the hands of prominent dealers, and but few available lots are obtainable elsewhere. The market has remained under this efficient control for some time past, and, judging from present appearances, there is no indication of their yielding it to others. Buyers, therefore, who leave their purchases until they are actually in need of supply may have to pay extreme rates. An occasional fluctuation in the market value must not be considered to demonstrate any weakness on the part of holders, but may be purposely permitted by them for certain special reasons. Hitherto forward sales have been made at lower prices than those accepted for spot parcels, but as the prompts have become due sellers have generally had to cover at a disadvantage. It is still thought that further covers have to be made for this month, and that the market will continue for awhile in an uncertain state. A small sale of fine foreign on the spot was reported at 70*l.*; on the other hand, a sale of 50 tons has been mentioned at 62*l.* for delivery all the year. The future of course depends upon the amount of support which the renowned operators intend giving to the market, and they have it in their power, if they are so disposed, to temporarily raise prices 5*l.* or 10*l.* higher, and assuming that the deliveries hereafter are equivalent to the arrivals, it is more than probable that the advance will be established. As we have so often pointed out, and again repeat, it is exceedingly dangerous for a market like the present for consumers to delay their purchases, and it is equally risky for "bears" to meddle with the market at such a time. It is not so many months since that our advice to buyers was expressed in the most emphatic terms that they should not delay making their purchases, for although the market was then apparently in an unsettled condition, we felt thoroughly assured from circumstances which came to our knowledge that a recovery would soon follow, and we did not hesitate to predict that 70*l.* would be paid again for tin. Like a good many other warnings which people occasionally receive, the intimation was partly disregarded, and by some ridiculed, but time has proved the correctness of our assertions, and many have had to pay very dearly for their disbelief and want of foresight, and it will probably be found more to their interest if they pay more attention to our remarks in future than they have done hitherto. There is little or no variation in the market for other metals, lead remaining quiet, spelter easy, steel inactive, and tin plates steady.

QUICKSILVER.—Business during the past week has been partially interfered with by the holidays, but the demand has been on a large scale, and the price is strong at 6*l.* 2s. 6d., with a rising tendency. The last Californian advices, moreover, report a serious attempt to curtail the production there by a combination of all the mineowners, and higher prices are consequently asked.

Messrs. PIXLEY and ABELL.—GOLD: The arrivals have been small, but the demand, which has only been for German account, has not been sufficient to absorb the whole of the total to hand, which consists of 77,170*l.* from India. The amount sent to the Bank up to this afternoon is 20,000*l.*——SILVER: The market has been firm during the week, the supplies having been small. The price, which at the date of our last circular was 49¼d., gradually improved to 49⅝d. to 49¾d. this morning. The Council drafts having been disposed of at an easier rate than was anticipated the demand is for the moment quiet, and the nearest quotation we can give is 42⅞d. per ounce. The arrivals during the week have been about 55,000*l.* from Germany; 58,600*l.* from America; 36,140*l.* from the Pacific: total, 149,740*l.* This last amount has not yet been sold. The P. and O. steamer takes at least 200,000*l.* to Bombay.

Messrs. FRY, JAMES, and Co.—COPPER has shown more strength, and although the selling has not been on a large scale there have been improved prices paid for all descriptions, and especially for furnace material, by the smelters.——IRON is without change.——TIN has kept fairly steady, but with rather less doing.——LEAD is again flat, and lower prices are being accepted.——SPELTER continues quiet.——TIN-PLATES a shade less in request.

Messrs. BROOKER, DORE, and Co.—TIN-PLATES: The demand keeps good. Messrs. E. P. and W. Baldwin are well booked forward.——GALVANISED IRON: The demand has slightly improved, but only for the home trade, and very few makers are at present working full time. Some attention has recently been called to the invention of M. Dodé for inoxidating iron and coating it with platinum. It has been alleged that the invention would in time supersede galvanising; for the information of our friends we may say that this is not likely to be the case The first process of inoxidating sheet-iron will be found useful for protecting iron from rust, but as it leaves the sheets a dull black colour it will only answer where painted sheets have before been used. The second and third processes of enamelling and coating the iron with platinum cost too much to answer as a substitute for galvanising, and the appearance of the platinumised iron is against its being generally adopted for roofing purposes, even if the cost were less.

The near approach of the Easter holidays, and the absence of many dealers, have somewhat affected the MINING SHARE MARKET this week, but a fair amount of business has been transacted both in tin, lead, and copper mines at advanced rates. The mines mostly dealt in have been Parys Mountain, South Frances, South Condurrow, Wheal Peevor, West Frances, Herodsfoot, West Chiverton, Glenroy, East Van, Van, Carn Brea, and a few others.

TIN MINES have been pretty active, and at better prices, but no change at present has taken place in the standard for ore. Carn Brea are quoted at 30 to 32; Dolcoath, 27 to 29; Cook's Kitchen, 2½ to 3; South Condurrow, 11½ to 12; South Frances, 10 to 10½; West Frances have been in request, and leave off 5 to 5½; Wheal Peevor, 9½ to 9¾; Tincroft, 10½ to 11; Wheal Agar, 3½ to 4; Wheal Basset, 22s. 6d. to 27s. 6d.; Wheal Grenvilles have further advanced to 3¼, 3⅜; Wheal Uny, 10s. to 12s. 6d.; Penstruthal 1s. 6d. to 2s. 6d.; Wheal Kitty (St. Agnes), 5s. to 10s.; West Basset, 5 to 5½.

COPPER has risen, and should the Chilians become involved in war we may see a considerable rise in price, and this has caused a good many enquiries for low-priced copper shares. Devon Great Consols, 2 to 2½. East Caradon, 5s. to 7s. 6d.; at the meeting a call of 3s. per share was made, and the prospects favourable. Marke Valley, 10s. to 15s.; at the meeting here the accounts showed a profit of 900*l.*, and assets over liabilities of 778*l.* Wheal Crebor, 6s. to 8s.; the lode in the stope in the 120 east is worth 8*l.* per fathom. The 108 east is worth 12*l.* per fathom. The lode in the winze below this level is worth 10*l.* per fathom. Parys Mountain, 10s. to 12s. 6d.; a special meeting has been called for Wednesday to pass resolutions in accordance with that passed at the late meeting for reconstructing the company under the name of the Parys Copper Corporation (Limited). Every shareholder in the present company will get a fully-paid up share in the new, and 15,000 shares have been offered at 10s. each to raise the capital absolutely necessary to carry on the mine, and of these we understand more than sufficient have already been taken by old shareholders, without applying to the outside public. Mellanear, 3½ to 3¾; West Seton, 4 to 6; West Tolgus, 26 to 28; Bedford, ⅛ to ⅜; Gawton, ⅛ to ⅜; Hingston Downs, ⅛ to ¼; South Caradon, 50 to 55.

LEAD MINES have been moderately active, and prices pretty well maintained. Van are firm at 20 to 21. Great Laxey, 15½ to 16½, ex div.; at the meeting, full particulars of which will be found in another column, the accounts and reports were passed, and notwithstanding the state of the lead market, and the recent strike at the mines, a dividend of 5s. per share (3750*l.*) was declared. Herodsfoot, 3 to 4; the ground in the 205 end south has improved for driving, and the 190 north is looking better for lead—fresh pitches have been set at the 80 and 147 levels. Pateley Bridge, ⅞ to 1⅛; the old company has gone into liquidation, and a new company has been registered with a capital of 30,000*l.* in 1*l.* shares. Roman Gravels, 8¾ to 9; there was sold last Saturday 100 tons of lead ore for 983*l.* 15s., and 200 tons more sampled for sale this week.

Tankerville, 3½ to 3¾; shaft down 13 fms. below the 206. The 206 end east, now 29½ fms. from the shaft, is worth 3 tons of lead ore per fathom; the 206 west worth ½ ton. The sale of ore for the 17th is 80 tons of No. 1 and 20 tons of No. 2 quality lead. East Van, 1¾ to 2; Leadhills, 2½ to 2¾; West Assheton, 22s. 6d. to 27s. 6d.; Bwlch, 1⅛ to 1¼; Bettws-y-Coed, 20s. to 25s.; Glyn, 10s. to 12s. 6d.; Minera, 9 to 11. West Chiverton have advanced to 2¾, 3; the mine, which has been under water for some months, is now in fork. West Pateley, 2 to 2½; Gwernymymydd, 4 to 4¼; D'Eresby Mountain, 30 to 40. Clementina, 1 to 1¼; at the general meeting, held on Thursday, the accounts and reports were unanimously received and adopted, and the prospects of the mine were highly spoken of. Aberllyn, 10 to 12; Caron, 2 to 2½; Grogwinion, 3 to 3½; Hartington, 1½ to 2; Mawston, 1½ to 2; Red Rock, 1⅞ to 2¼; St. Harmon, 1½ to 2½; West Wye Valley, 1¼ to 1⅜; Wye Valley, 1¼ to 1⅜; Great Holway, 4½ to 5; Denbighshire, 1 to 1½; Frongoch, 2 to 2½.

FOREIGN MINES.—Arendal, 3½ to 4½; Cape Copper, 27 to 29; Colorado, 1⅞ to 2; Don Pedro del Rey, 14s. to 16s. Panulcillo Copper Company accounts show a net profit on the half-year ending Dec. 31 of 9408*l.* 5s. 3d. Placerville, 2½ to 2¾; Blue Tent, 2¼ to 2½; Eberhardt and Aurora, 4½ to 4¾; Frontino and Bolivia, 2 to 2¼; Huitafall, 1⅞ to 2¼; Last Chance, 7s. 6d. to 12s. 6d.; New Zealand Kapanga, 7s. 6d. to 12s. 6d.; New Quebrada, 1⅛ to 2⅛; Richmond, 8⅞ to 9⅛; Santa Barbara, 2¼ to 2½.

The Market for Mine Shares on the Stock Exchange has, considering the approach of the holidays and the general indisposition for business, been fairly active, and prices have been maintained. Those interested in lead mine shares will be much gratified to read the opinion expressed at the meeting of the Linares Company by Mr. John Taylor (one of the best possible authorities) upon the prospects of the metal. The American lead is less likely to effect the European markets than was anticipated; the United States duty of 9*l.* 2s. tends to keep up the price, and as the American lead is contaminated with antimony and other impurities, which prevent its being rolled to such an extent as to suit the China market. This fact having been already discovered, the shipments of European lead to China show a satisfactory increase. The production has much diminished, and the prices of labour and materials have been greatly reduced, so that the improved prices which it is confidently believed will speedily be established, will place lead mine shares in a very satisfactory condition.

Sierra Buttes, 2 to 2½; the net profit for the half-year ending December is 7811*l.* 18s. 8d., which, with 9367*l.* 5s. 11d. brought down from the previous account, makes the amount standing at the credit of profit and loss 17,179*l.* 4s. 7d. Out of this the directors recommend that a dividend of 1s. 6d. per share, free of income tax, amounting to 9197*l.* 10s., be declared at the forthcoming general meeting, after which a balance will remain of 7991*l.* 14s. 7d. to be carried forward as usual. The dividend proposed to be paid amounts to 9187*l.* 10s., while the half-year's earnings, as shown by the accounts, are only 7811*l.* 18s. 8d., or 1375*l.* 11s. 4d. short of the sum required. The small amount of earning is in part due to the cost of permanent works in connection with the mills and water supply. Under these circumstances, and considering the improving condition of the mine, the directors have no hesitation in recommending the above rate of dividend, and that the deficiency should be taken from the reserve fund, which was created for meeting any exceptional outlay. The mine has produced 28,547 tons of ore, at an average cost for mining of 8s 0*d* per ton, and the mills have crushed 28,260 tons at an average cost of 30s 6*d* per ton, thus making the working expenses 33s 7*d* per ton for the half-year. Including the produce of the tailings, the average yield of the ore was about 35s 9*d* per ton.

London and California, ⅜ to ⅝; the directors report to be presented at the meeting on Thursday states that the amount at credit of profit and loss, including 21,783*l.* 5s. 11d. brought forward from the previous account, is 22,748*l.* 6s. 11d., which the directors recommend be carried forward. The net result of the operations at the Original Amador Mine has been to add 965*l.* 1s. to the credit of profit and loss, and this amount would have been larger but for the fact that the mill was compulsorily idle for about 40 days in all, owing to breakages at various times in the Amador canal, from which the water supply is obtained. The mine produced 2194 tons of ore, and the mill crushed 2236 tons, which yielded in free gold $35,800·64, an average per ton of $16·01. The cost of mining, including hoisting, &c., was $9 47 per ton, and a milling $2·73 per ton, thus making the average working expenses $12 20 per ton.

Richmond, 8¾ to 9; Mr. Probert has arrived at the mines. The week's run was $60,000, from 1209 tons of ore. During the week the refinery produced $40,000. The mine is looking well, and it is believed that Mr. Rickard's estimate of reserves will prove correct. The new works are very satisfactory; they have put the hydrocycle on drosses, of which there is a large accumulation. Shareholders should be particularly cautioned against letting themselves be led away by market operations. The shares have been steady for some months past, and it is to be hoped that nothing will occur to cause a return of those violent fluctuations which were previously so common. The manager reports a continued improvement in No. 11 chamber, and that all the machinery, both in the mine and smelting works, is working very smoothly. Since the previous letter, he writes (March 22)—"Developments in the mine have been very satisfactory. The upper part of No. 11 chamber has greatly improved in drifting east, the ore widened, and at the present point (33 ft. east of the rise) the ore has been opened on 30 ft. Without reaching the hanging wall it appears to be making back over the No. 11 chamber, and what we supposed to be the hanging-wall appears to be only a horse of limestone. A rise has been put up from this point, and connected with the 400 east from a cross-cut a distance of 50 ft. all the way in ore. A rise has been started in the back of the 400 to rise up towards the 200, and I intend starting on the 1st of the month a cross-cut on the 200 to explore the ground north of the quartzite. The ore on the 400 has every appearance of making up in the tip top ground. It is all virgin ground, and there is every probability of finding ore making in the No. 8 chamber to trace the ore. We followed a small seam of ledge matter, which has now opened to a vein 2 ft. wide of good ore. This is a very fine prospect, and bids fair to open out to a good body of ore."

In Lead Mine Shares a large number of transactions have taken place, though in many cases lower prices have been accepted. Another effort is to be made to obtain some profit out of the North Laxey Mine, which hitherto appears to have confirmed the rule that all the mines around those of a very prosperous company usually disappoint the shareholders, and as every resuscitation increases the loading of the capital account it is to be hoped this will be the last reconstruction attempted. At the meeting on Thursday (Captain R. Rowe in the chair) the resolution passed on March 21 was confirmed. It was to the effect "that the liquidators shall have full power and authority to enter into any arrangement by which they may receive in compensation, or part compensation, for a transfer or sale of this company's property and assets, shares, or other like interests in another company, for the purpose of distribution amongst the members of this company; and to enter into any other agreement whereby the members of this company may, in lieu of receiving cash, shares, or other like interests, or in addition thereto, participate in the profits of or receive any other benefit from the purchasing company."

North Hendre, 6 to 6¼; the prospects of this mine are considered to be excellent. At the recent meeting a dividend of 5s. per share was declared. The mine has already returned more than the whole amount of capital invested in it, and is regarded by competent authority as a permanent property.

Mineral Corporation of Great Britain, 10 to 11; the air-compressor to be used at the mines of this company has been completed and tested at the works. The diagrams taken were so near to absolute perfection that very few engineers will be inclined to believe that they were fairly taken; this, indeed, appears to have been the view of the inventor himself; for upon receiving them he declined to have them published until they were formally certified by the engineer who took them. The certificate has now been signed by Mr. Oliver, and an accurately reduced diagram appears in another column. Should the machine in use fulfil the expectations which the diagram justify Mr. Schram will not require to ask for orders, nor will purchasers have cause to complain. The corporation may be congratulated on the selection made. Then maager reports favourably upon the progress making at the mines.

Grogwinion, 3 to 3½; favourable accounts continue to be received from this mine, and another parcel of 100 tons of lead has been sampled for sale next week. Frongoch, 2 to 2½; good progress is making in all departments, abundance of ore is being raised, and a large parcel will shortly be sent to market. Caron, 2 to 2½; the new issue of shares is being rapidly absorbed by the members, and the mine continues to yield good results, with excellent future prospects. Wye Valley, 1¼ to 1¾; the deep level is looking very promising, and expected to improve, as the lode between the 22 and the 46, or bottom level, has been very productive where proved by the new winze, which has been sunk in it in a rich course of lead for many fathoms. West Wye Valley, 1¼ to 1¾; all operations are going on satisfactorily, and the sinking of the shaft is making good progress. Red Rock, 1¾ to 2¼; no fresh news this week. Mawston, 1½ to 2; a parcel of lead ore has been delivered this week. The mine looks well. Hartington Moor, 1½ to 2. Crosswood, 1½ to 2, cum all.

Subjoined are the closing quotations:—

Assheton, ⅝ to ⅞; Carn Brea, 30 to 32; Devon Consols, 2 to 2¼; Dolcoath, 27 to 29; East Caradon, ¼ to ½; East Van, 1⅞ to 2⅛; Gwernymynydd, 4 to 4¼; Glyn, ⅜ to ⅝; Great Laxey, 15½ to 16½; Hingston Down, ⅛ to ⅜; Leadhills, 2 to 2⅛; Marke Valley, ⅛ to ¾; Parys Mountain, ⅜ to ½; Pateley Bridge, 1 to 1⅛; Penstruthal, 1-16th to 3-16ths; Roman Gravels, 8¼ to 9; Rookhope, ⅜ to ⅝; Tankerville, 3¼ to 3¾; Tincroft, 10 to 11; Van, 20 to 21; West Assheton, 1⅛ to 1¾; West Basset, 4¾ to 5¼; West Chiverton, 2⅞ to 3; Wheal Crebor, ⅛ to ⅜; Wheal Grenville, 2¼ to 2¾; Almada and Tirito, 3-16ths to 5-16ths; Birdseye Creek, ⅜ to ⅝; Blue Tent, 2¼ to 2½; Canada Gold, 1⅛ to 1¾; Cape Copper, 27½ to 28½; Chontales, ⅜ to ⅝; Colorado United, 1⅞ to 2⅛; Don Pedro, ⅝ to ⅞; Eberhardt and Aurora, 4¼ to 4¾; Emma, ⅛ to ¼; Exchequer, 1-16th to 3 16ths; Flagstaff, ½ to ¾; Frontino and Bolivia, 2⅛ to 2⅜; Huitafall, 2 to 2⅛; I.X.L., 1 16th to 3-16ths; Javail, 3-16ths to 5 16ths; Kapanga, ⅜ to ⅝; Last Chance, ⅜ to ⅝; New Quebrada, 1⅛ to 2⅛; Pestarena, 1-16th to 3 16ths; Placerville, 2¼ to 2⅜; Plumas Eureka, 2⅞ to 3½; Port Phillip, ⅜ to ½; Richmond Consolidated, 8⅞ to 9⅛; St. John del Rey, 265 to 275; San Pedro, 2s. to 4s.; Sierra Buttes, 2 to 2¼; South Aurora, ⅛ to ¼; United Mexican, 3¾ to 4¼.

THE TIN TRADE.—The quantity of tin sold from the undermentioned mines during March was 1029 tons 0 cwt. 2 qrs. 26 lbs.:—Wheal Agar, Wheal Basset, West Basset, Blue Hills, Carn Brea, Cook's Kitchen, South Condurrow, Dolcoath, South Frances, West Frances, Wheal Grenville, Wheal Jane, Wheal Kitty, Wheal Owles, Penhalls, Penstruthal, East Pool, Tincroft, Wheal Uny; tin streams.

THOS. B. PROVIS, C.E., Sec.

Mining Institute of Cornwall, Camborne, April 8.

PANULCILLO COPPER COMPANY.—The accounts for the first half of current financial year, the result of which will be included in the yearly accounts to be submitted at the ordinary general meeting in November next, indicate that the operations at Panulcillo in six months ending Dec. 31 have resulted in a net profit of 9408*l.* 5s. 3d. Of regulus 3101½ tons were produced at Panulcillo in the half year, the copper contents of which by analyses amounted to 1463½ tons of pure metal; price realised on the average, $13·61 per quintal metrico.

NATIONAL BANK OF WALES.—A new bank has been formed in Manchester under this title, with a capital of 2,000,000*l.*, in shares of 20*l.* each, one-tenth of which is to be first issued. The names of Mr. Morgan Lloyd, Q.C., M.P., of Mr. F. R. Crawshay, J.P., and others equally well and favourably known in the Principality, are on the list of directors. From the prospectus, which will be found in another column, it will be seen that since any banking company was established for the express purpose of affording direct banking facilities for North and South Wales the population, wealth, and general trading operations have more than trebled, and many extensive districts are at the present time totally unprovided with banking facilities; and it has been matter of surprise that no additional banking accommodation has been provided to further develope the resources of these important districts. Whilst there is a Bank of England, a Bank of Ireland, and a Bank of Scotland, there is no National Bank for the Principality. Of nine banks quoted on the Stock Exchange, and to which reference is made in the prospectus, five paid 20 per cent. per annum on the capital paid-up, the remaining four returning 12½, 12½, 13½, and 15 per cent. per annum respectively. In settling the Articles of Association the directors have been guided by the experience of the most successful modern banks. Powers have been taken to carry on every safe form of banking, so as to secure a fair return upon the capital invested. It is intended to conduct the business so that every legitimate trader, however small his transactions, and all sound trading shall be encouraged. It is well known that those who are interested in the success of a bank not only carry on their own business with such bank, but exert themselves to promote its general prosperity. The nominal value of the shares has been fixed at such a sum as to enable all customers to become shareholders in the bank, and thus participate in the profits of the company. The directors have offers of several suitable sites for banking premises, both for the head offices and branches. To ensure the safety of applicants for shares, and that the business shall not be commenced before the subscription of adequate capital, no allotment will be made until all the 10,000 shares forming the first issue have been

applied for, and no applicant for shares can be called upon to pay any money until the whole of the first issue has been allotted. This latter provision has frequently been referred to in the *Mining Journal* as offering a guarantee that all capitalists should require against allotments "to save the directors," as it is called, in the language of promoters. The head office of the bank is to be at Manchester, and support is promised in quarters from which lucrative business is to be expected.

UNITED VAN CONSOLS AND GLYN LEAD AND BARYTES MINING COMPANY.—The shareholders will be pleased to hear that the directors, on Thursday, acquired possession of the Van Consols Mine by payment of the purchase money, as provided for by the contract, and it is contemplated shortly to call a meeting of the proprietors for the purpose of electing directors, and making arrangements for the issue of the unallotted preference shares. The mining operations will be actively resumed forthwith at the united mines.

LEAD MINING IN CUMBERLAND.—A company is in course of formation at Newcastle-on-Tyne for the purpose of working a valuable mineral property "in the heart of the richest lead mining district in England, and entirely unwrought," and the prospectus will be issued as soon as the plan and reports are ready. The sett is a mile in length, and averages nearly half a mile broad. It contains the proved lead-bearing rocks now working at Green Hurth above water level, and below this the same section as produced such enormous quantities of ore at Tees Side Mine; both these mines are less than a mile distant from the sett. The property is held on lease at a dead rent of 25*l.* per annum, merging into royalty of one-tenth above the Tyne Bottom limestone, and one-twentieth below it. The four north and south veins laid open at Green Hurth Mine adjoining traverse the entire length of the sett, and these veins are crossed obliquely by the Providence vein, formerly so rich in the Tees Side Mine, and also by two veins called Metal Band veins. These again are intersected by a number of east and west veins well known in the district. Sir John's vein, Baxter's, and the Clargill Head north and south veins were all very rich in silver, and some of them must, it is considered, traverse this sett.

SOUTH DEVON UNITED COPPER MINES.

Under the above title the well-known mineral properties of BROOKWOOD and EMMA MINES, situated near Buckfastleigh, Devon, are to be vigorously worked. The prosperity of these two mines having only one supply of water for pumping and dressing purposes naturally were dependent upon an harmonious understanding existing between the respective proprietors. Unfortunately, this was not the case, and to such a degree did their views conflict that one mine actually brought the other to a standstill, and *vice versa*. The only solution of this difficulty was the uniting of the two properties, and the acquisition of the water-rights under one proprietary. This at last has been accomplished by the present company after considerable trouble and difficulty. The different interests have been purchased, and united under ore lease for 21 years from the Earl of Macclesfield, with a reduction in royalty to 1-24th.

Notwithstanding the hindrances to the working of these mines alluded to above upwards of 96,000*l.* worth of ore was sold from Brookwood, and the subscribed capital returned in dividends to the shareholders over and over again, whereas with even a larger output than this from Emma all has disappeared in the luxury of law expenses. It is pleasing to know that much more remains to be extracted.

In Brookwood the resident agent, Captain Hooper, reports to have ready for stoping from 80,000*l.* to 90,000*l.* worth of ore, with large bodies of rich mineral extending both east and west, and the capabilities of Emma he puts down to be equal to the former mine, so that with ample water power and improved dressing machinery large profits cannot fail to be made. The dressing machinery hitherto in use has been of a very poor description, and the halvans at Brookwood are consequently full of mineral. Captain Clemo, manager of the Devon Great Consols, reports them to contain 14,000*l.* worth of ore, which could be dressed with ease by improved machinery, leaving a good profit to the company. Starting under such auspicious circumstances, with a very influential board of directors, we may look forward with confidence to the South Devon United Mines being one of the richest and most prosperous companies in the West of England. Mr. Battye, the respectability of whose office is well known, is the secretary.

MODERN MACHINERY FOR PREPARING MACADAM.—At the Society of Engineers, on Monday (Mr. R. P. Spice, President in the chair) a paper was read by Mr. Charles E. Hall, on Modern Machinery for Preparing Macadam for Roads. After introducing the subject generally, the author proceeded to describe the various machines in use in some of the leading quarries and other works in the United Kingdom. The machines were illustrated by diagrams, and in describing them the author commenced with the original Blake Stone Breaker, which was introduced into this country in 1862, and he followed the successive developments down to the present year. The author confined himself to those machines which had been practically successful, and which include Blake's improved, Archer's original, Ord and Maddison's, Smith and Roberts', Maddersons, Marsden's, Archer's latest, Hope's, and Hall's "Multiple Action" Machines. The points of excellence and difference were explained by the author, who defined the requirements of a machine necessary for the production of perfectly cubical machine-broken stone for road purposes. Particular attention was called to the importance of dealing with stone in large quantities by an improved disposition of the various machines, in order to secure a better form of metal, with less waste than is usual under the ordinary working conditions, and reference was made to those works where the plan had been more or less closely followed. The development of various expedients for cubing the stone was noticed, and the results (so far as they could be arrived at) giving of the working of each. The author stated that he was unable to fix definitely the cost of producing macadam by machinery which should be true in all cases, as circumstances tended very greatly to modify it. He found from authentic sources that the cost ranged from 25 to 100 per cent. in favour of machine-broken as against hand-broken macadam.—At the last monthly meeting the following gentlemen were duly elected —Mr. Thomas Dawson Cooper, of Middlesborough, and Mr. William Wallace Copland, of Widnes, as members.

HEATING ATMOSPHERIC AIR.—The invention of Mr. S. HALLAM, of Manchester, has reference to improved arrangements whereby atmospheric air solicited or forced by a revolving fan or other exhausting or impelling mechanism is caused to impinge upon and pass over the surface of a series of steam or otherwise heated pipes, contained in a chamber or chest, and also to the application in connection therewith of plates, or bafflers, or casing jackets, so placed as to absorb the radiant caloric evolved from the heating pipes, and to transmit the heat so absorbed to the air traversing the heating chamber. In one modification of the invention a number of inclined brass, copper, wrought-iron, or other metal tubes are attached at their upper ends to a pipe suitably formed to receive them, and which is itself connected by a controlling cock or valve to a main pipe communicating with a boiler or other steam reservoir. The lower ends of these tubes are coupled to a similar pipe, from which the water resulting from condensation is continuously withdrawn by any of the usual methods and appliances available for such purpose. Each series, as above described, forms one separate range, and is coupled independently and separately to main steam and condenser water pipes, and provided with suitable controlling and regulating cocks or valves. A number of such ranges or series adequate to provide the necessary aggregate amount of heating surface are included in a heating chamber of suitable capacity, and between each range are placed partitions or plates of cast iron or other good heat recipient or absorbent; upon the surfaces of such plates are formed at suitable intervals projections or bridges, so placed as to compel the atmospheric air in its passage not only to traverse but also to continually cross and recross transversely the heating pipes; the plates themselves, at the same time, being highly heated by their absorbtion of radiant heat serve also to augment the temperature of the body of air which traverses their surfaces.

MARSH'S PATENT BLASTING MACHINE.

The case of Reuss *v.* Lever was before Vice-Chancellor Hall on Wednesday. In this case the plaintiff is a merchant of Manchester, and the defendant is a member of the firm of Ellis Lever and Co., of London and Manchester. Mr. Dickinson, Q.C., moved for an injunction to restrain the defendant from manufacturing or causing to be manufactured a blasting or air compressing machine for use in collieries. He said that a person named Marsh was the original inventor of the machine, but the patent was purchased by the defendant Lever, who communicated with the plaintiff with the view of bringing it out. The result was that the plaintiff, who was not a miner, but an engineer and merchant, had the machine sent to him and examined it. He considered that very considerable alterations were required in order to make it workable, and the result was that considerable correspondence passed between the parties, which resulted in a contract being entered in between them in Oct., 1878, which contract gave the plaintiff the sole right to make and sell Marsh's machines upon paying a royalty of 6*l.* upon each machine. It was, however, distinctly understood that the plaintiff should have an absolute property in the patent itself, and that if he did not make and sell the machines the agreement should cease and be determined. There was, therefore, a clear agreement between the parties, and he considered that if he could show that the plaintiff's right had been interfered with he was entitled to an injunction. What he alleged was that on March 19 or 20 last it was discovered that there was a machine being made by Mr. Wallbrook, who for the purposes of the action had been made a defendant in in the suit. That machine was being made under the superintendence of Mr. Marsh, the patentee, who was also a defendant. The fact itself was not denied, but it was attempted to be justified—first, because the defendants said they granted the license in order that they might make money by the receipt of the 6*l.* royalty, but that the bringing out of the machine had been so delayed that the license had been forfeited; and, secondly, that they could put an end to the license at any time. He was there to say on behalf of the plaintiff that day—and, indeed, to prove—that there had been no delay. His Lordship, in delivering judgment, said he did not consider it was necessary that a licence to work a patent should be under seal, and he took a different view to that of the learned counsel as to what class of licences were revocable and what irrevocable. From what he could see he considered that this was not a revocable licence, because it was of an exclusive character. He considered that it would be a great hardship upon the plaintiff to be turned out of his position before the action was tried. He felt bound to give him protection. He did not say that the defendants were not right when they stated that there was an implied understanding that the patent was to be brought out, but at present he could not see that they had any strong ground of complaint. The whole subject was ripe for discussion and if they had suffered any loss they would receive redress. Until the matter was discussed he should make an order granting an injunction in the terms asked.

THE LARGEST LOCOMOTIVE IN THE WORLD.—"Uncle Dick" weighs 65 tons, and he is 60 ft. long from his head light to the rear end of his tender. He is the biggest locomotive in the world, and has been turned out of the Baldwin Locomotive Works for duty on the precipitous inclines of the Atchison, Topeka and Santa Fe Railroad. A boiler 21 ft. long supplies steam for cylinders 20 in. by 26, and gives motion to eight 42 in. drivers, while a large tank surmounting the entire structure not only carries a water supply, but helps to give Uncle Dick a tighter grip on the rails. His driver will have control over three independent systems of air-brakes, and can bring to bear at once upon his wheels a restraining force of 75 tons, which is none too large, inasmuch as a "shoe pressure" of 50,000 lbs. is required to keep him, when standing still and alone, on the steep road over the Ruton Pass from surrendering to gravitation and rushing down hill by his own weight. How heavy these grades are can be understood when it is noted that one end of Uncle Dick will often stand more than 3 ft. higher than the other, so that in travelling his own length he will do the work of lifting about 250 tons a perpendicular foot. And yet this monster, rejoicing in his strength, will rush up the flank of the Rocky mountains with ten loaded cars behind him.

WASHING AND WRINGING MACHINES.—In connection with what may be termed domestic machinery washing and wringing machines occupy a prominent place, and it is surprising to notice the amount of mechanical ingenuity which has been displayed in their construction. The earliest invention bearing on the subject appears to have been in A.D. 1691, and the inventions from that date to 1866 have already been summarised in the volume entitled—Abridgments of Specifications relating to Washing and Wringing Machines, published by H.M. Commissioners of Patents (1s. 8d. by post), and the second part has now been issued (10½d. by post) bring the summary to the end of 1876. The volume contains much information of great value to the inventors and manufacturers.

Now ready, THE MINING JOURNAL, VOLUME FORTY-EIGHT, FOR 1878. Neatly bound and lettered, price 11.12s. 6d. To be had from our office, 26, Fleet-street, London, or through any newsagent or bookseller.

NORTH LONDON RAILWAY COMPANY.

THE DIRECTORS of this COMPANY are prepared to RECEIVE TENDERS for the SUPPLY of

THIRTY-TWO THOUSAND FIVE HUNDRED TONS
(or any lesser quantity) of
SMOKELESS SOUTH WALES STEAM COAL,

Suitable for Locomotive purposes, the deliveries to be extended over a period of twelve months, or thereabouts, commencing about the middle of July next.

Particulars of terms and conditions of tender can be obtained upon application to the Locomotive Superintendent, at the Company's Works, Bow-road, E.

Tenders, addressed to the undersigned, to be sent in before Ten o'clock on Tuesday, the 6th May, marked outside "Tenders for Locomotive Coal."

The Directors do not bind themselves to accept this lowest or any tender.

G. BOLLAND NEWTON, Secretary.

Euston Station, London, N.W., 9th April, 1879.

NORTH LONDON RAILWAY COMPANY.

THE DIRECTORS of this COMPANY are prepared to RECEIVE TENDERS for the SUPPLY of

ONE THOUSAND TONS OF HOUSE COAL,

The deliveries to be extended over a period of twelve months, or thereabouts, commencing in May next.

Particulars of the terms and conditions of tender can be obtained upon application to the Locomotive Superintendent, at the Company's Works, Bow-road, E.

Tenders, addressed to the undersigned, to be sent in before Ten o'clock on Tuesday, the 6th May, marked outside "Tenders for House Coal."

The Directors do not bind themselves to accept the lowest or any tender.

G. BOLLAND NEWTON, Secretary.

Euston Station, London, N.W., 9th April, 1879.

NEW ZEALAND—STEEL RAILS.

TENDERS INVITED.

TO IRONMASTERS.—WANTED 100,000 TONS OF STEEL RAILS,
To be manufactured in New Zealand.

PUBLIC WORKS OFFICE, WELLINGTON, NEW ZEALAND,
6th November, 1878.

WRITTEN TENDERS will be received at Wellington by the Hon. the Minister for Public Works up to 30th September, 1879, for the SUPPLY of the WHOLE or any portion of

ONE HUNDRED THOUSAND TONS OF STEEL RAILS,

To be manufactured within the Colony from New Zealand ores. Payment will be made in cash on delivery at the works—the Government of New Zealand agreeing to pay, in addition, one-half of the cost of the conveyance to the Colony, by sea, of the workmen to be engaged in the manufacture.

Information as to the mineral resources of New Zealand, and maps indicating the various localities in which mineral deposits are situated in relation to means of transport, may be had on application to the Agent-General of New Zealand, 7, Westminster Chambers, Victoria-street, London, or to Walton W. Evans, Esq., 68½, Pine-street, New York.

As it is unlikely that intending contractors will enter into an engagement of the above nature without first satisfying themselves by personal inspection as to the position and extent of the raw material in New Zealand required for the manufacture of iron, every facility and information on this subject will be afforded on application to Dr. Hector, C.M.G., F.R.S., Director of the Geological Department, Wellington.

For the information of parties desiring to tender, it may be stated that the official returns show that there were imported into New Zealand within the last eight years 15,500 tons of cast-iron and 93,000 tons of wrought-iron, exclusive of iron for Government and other railways, during which period 1063 miles have been constructed and opened for traffic.

New Zealand colonists who may have friends and correspondents connected with the iron manufacture are requested to be good enough to draw attention to the highly advantageous and profitable field for enterprise which this colony presents to those who can bring the necessary capital and practical experience to bear upon such manufacture.

JOHN KNOWLES,
Under Secretary for Public Works.

CAPPER PASS AND SON, BRISTOL

PURCHASERS OF

LEAD ASHES, LEAD SLAGS, SULPHATE OF LEAD, HARD LEAD, BRASS SLAGS AND ASHES, COPPER REGULUS, MATTE, SCORIA, TIN ASHES, TERNE ASHES, &c., and MIXED ORES or REFUSE, containing LEAD, COPPER, TIN, or ANTIMONY.

GEO. G. BLACKWELL,
5, CHAPEL STREET, LIVERPOOL,

PURCHASER OF

MANGANESE, ARSENIC FLUOR-SPAR, WOLFRAM, BLENDE, CALAMINE, CARBONATE and SULPHATE OF BARYTES, ANTIMONY ORE, CHROME ORE, MAGNESITE, EMERY STONE, PUMICE STONE OCHRES AND UMBERS, CHINA CLAY, LEAD ORE FOR POTTERS TALC, PHOSPHATE OF LIME, &c.

AUSTRALIAN TIN—PRIZE MEDAL, 1877.

THE UNDERSIGNED is PREPARED to EXECUTE ORDERS for the CELEBRATED

"KANGAROO" BRAND.

S. L. BENSUSAN.

Kangaroo Tin Works, Sydney, December, 1878.

TO CAPITALISTS.

THE SUM OF £7000 CAN BE INVESTED IN A VALUABLE GOING CONCERN, with reasonable certainty of at least being doubled during the present year. The property is a LEAD MINE, on which a very large sum has been expended, and which is already making substantial returns, meeting working expenses. There is a large quantity of rich lead ground laid open, which is being monthly added to by the driving of levels. Even at present low prices the ore of thie mine fetches above £14 per ton, and as the market for lead is rising increased quantities will shortly be sold at higher prices, leaving large profits.

There is an EXTENSIVE PLANT of EFFICIENT MACHINERY, &c., nearly all new in the last three years. The whole capital to pay dividends on of the present company is only £13,500, but a much larger sum has been expended on the property by former parties. An investment promptly made can scarcely fail to greatly increase in value in a few months. Several parties can subscribe the above amount.

Van Lead Mine was bought in 1868, and in a very short time the 12,000 shares of £4¼ each rose to £80; dividends since paid, £23 per share, and the present price of 15,000 shares, £20 per share. Great Laxey was bought in 1863; the 15,000 shares of £4 each soon rose to £12; dividends since paid, £30 per share, and present price, £17 per share. Roman Gravels was bought in 1871, and the 12,000 shares of £7 10s. each rose soon to £22; dividends since, £7¼ per share, and present price £9, &c.

The Mine in which an interest is now offered is in only 9000 shares, and the price would not exceed £2 per share if purchased without delay. Full particulars and every facility for investigation given.

Address, in first instance, "E., 82," Address and Enquiry Office, "Times" Office, E.C.

COAL MINES REGULATION ACT, 1872.

EXAMINATION FOR MANAGERS' CERTIFICATES OF COMPETENCY.

DISTRICT UNDER THE CHARGE OF RALPH MOORE, ESQ., H.M. INSPECTOR OF MINES.

NOTICE IS HEREBY GIVEN, that an EXAMINATION for MANAGERS' CERTIFICATES OF COMPETENCY, under the above named Act, will be HELD on the 22nd day of May, and CANDIDATES INTENDING TO PRESENT THEMSELVES at such Examination must, on or before the 10th day of May, notify such intention to the Secretary of the Board of the above-mentioned District, from whom all information as to particulars can be obtained.

By order of the Board,
R. CALDER, Secretary,
290, Renfrewstreet, Glasgow.

N.B.—Persons who do not reside within the District are equally eligible for examination with those who do.

COAL MINES REGULATION ACT, 1872.

EXAMINATION FOR MANAGERS' CERTIFICATES OF COMPETENCY.

DISTRICT UNDER THE CHARGE OF HENRY HALL, ESQ., H.M. INSPECTOR OF MINES.

PERSONS desirous of being EXAMINED in this District for MANAGERS' CERTIFICATES OF COMPETENCY, under the above-named Act, should at once COMMUNICATE with the Secretary to the Board of the above mentioned District, at the following address:—31A, King-street, Wigan.

By order of the Board,
MASKELL WM. PEACE, Secretary.

N.B.—Persons who do not reside within the District are equally eligible for examination with those who do.

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London: LONGMANS AND CO.

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LEAD ORES.

Date.	Mines.	Tons.	Price per ton.	Purchasers.
April 10	North Hendre	25	£ 9 10 0	Walker, Parker, & Co.
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—	ditto	100	10 2 6	Adam Eyton.
—	Prince Patrick	30	9 14 6	Walker, Parker, & Co.
—	ditto	20	10 4 0	Quirk, Barton, and Co.
—	Rhydalun	20	9 18 6	Adam Eyton.
—	Wagstaff	13	9 0 6	Adam Eyton.
—	South Pant y-ne	5	8 10 0	Walker, Parker, & Co.

BLENDE.

Date.	Mines.	Tons.	Price per ton.	Purchasers.
April 9	Talargoch	220	£ 8 12 6	Swansea Vale Co.

Copper ores for sale at the Royal Hotel, Truro, on Thursday next—Mines and parcels.—Devon Great Consols 869—South Caradon 540—Marke Valley 285—Gawton 224—Glasgow Caradon 190—Phœnix 135—Hingston Down 121—Wheal Crebor 110—Bedford United 61.—Total, 2535 tons.

Notices to Correspondents.

*** Much inconvenience having arisen in consequence of several of the Numbers during the past year being out of print, we recommend that the Journal should be filed on receipt; it then forms an accumulating useful work of reference.

MINING JOURNAL.—Bound volumes wanted of the Journal for the years 1870, 1871, 1872, and 1876. Any subscriber having them to dispose of will oblige by stating price. Address, "R. C. C.," *Mining Journal* Office, 26 Fleet street.

HALL'S STONE BREAKER AND CRUSHER.—I shall be obliged if you will ask any of your readers to inform you in an early number of your valuable Journal the address of the manufacturer of Hall's Stone Breaker and Crusher, which was some time since advertised in the Engineer.—JAMES ARTHUR MORGAN, F.G.S.: *London, April* 9.

Received,—"M. P." (Wath-upon-Dearne)—"W. E." (Colorado United)—"R. A." —"Constant Reader" (Neath)—"Director:" We will endeavour to do so next week—"Shareholder" (Richmond)—"Constant Reader" (Wemyss)—"A. T.:" Next week—"C. B." (St. Day)—"A. W. B." (Ludcott and Wrey).

THE MINING JOURNAL,

Railway and Commercial Gazette.

LONDON, APRIL 12, 1879.

A NEW SALT FIELD.

The interest caused in the commercial world by the announcement recently made that Messrs. BOLCKOW and VAUGHAN had discovered the means by which Cleveland iron can be converted into steel has just now been increased by the statement that in the same locality it is intended to develope the salt resources which were brought to light by accident a few years ago. It was thought at one time that the coal measures would be found south of the Tees, although this was doubted by Sir R. MURCHISON, so to prove the matter they were bored for at Middlesborough by Mr. VAUGHAN to a depth of 1800 ft., when rock-salt was encountered, but the Permian magnesian limestone was not reached. After passing through the red marl the borers acting for the contractors, Messrs. MATHER and PLATT, came upon the rock-salt, the first portion being 12 ft. thick rather dark, then 4 ft. dark, 3 ft. 6 in. very light, 27 ft. rather dark, 43 ft. 6 in. light, with other descriptions below, giving a total of red marl and salt of 254 ft. 10 in. at a depth of 437 yards 2 ft. 4 in. from the surface. After this discovery Messrs. BELL BROTHERS, on the other side of the river, proved the same deposits much closer to the surface. It appears it is on the outskirts of the upper red sandstone overlying the carboniferous that the saliferous or salt-bearing rocks are generally found, and in Cheshire, Worcestershire, and Lancashire the gypsuous and saliferous marls, shales, and clays of the trias are between 1000 ft. and 1500 ft. thickness, in many places containing large deposits of rock-salt from which is supplied the salt of daily use; but we find as a rule that deposits of chloride of sodium (common salt) are accompanied with layers and intercalations of gypsum, so that from the uniform presence of two acids, sulphuric and hydrochloric, they indicate a common origin. But we have the same appearances in Cleveland as in Cheshire, for Mr. ORMEROD gives the division of the new red sandstone in Cheshire as follows—1. Gypsum and saliferous beds 700 ft.; 2. waterstone 400 ft.; and then butter sandstone. The beds of which the rock-salt are composed are estimated at about 3000 ft. in thickness, and one theory with respect to them, which has met with a good deal of approval, is that they owe their origin entirely to the elevation of the mountain chains with which they are so intimately connected, during which small valleys and ravines would be cut off from connection with the sea by ridges of land, and would form salt-lakes and lagoons.

Mr. PEACOCK, mining engineer, who is the author of a paper on the new red sandstone of Cleveland and the rock-salt found in it, informed us a few days ago that in his opinion Middlesborough would become the greatest salt-producing district in the kingdom, for in some places it was 40 ft. thick, pure crystal, and would extend over a vast area, and would be extensively consumed at the chemical works on the Tyne, as well as exported from there, and it certainly is surprising that such valuable known deposits should be left untouched until just now. But the change is now about to take place, for within the last few days one of the principal Liverpool exporting firms has visited Cleveland for the purpose of procuring a suitable site for the erection of the necessary works. Thus a new industry will be added to Middlesborough which will give it even a more important position than it now enjoys.

As to the extent and thickness of the deposits opinions may and no doubt do vary, but that they are very extensive does not admit of any doubt at all. Mr. Peacock, and the geologists who support his views, identify the strata above the rock salt at Middlesborough with that of Cheshire (the Keuper), and, consequently, the rock salt of one with that of the other, which some persons consider as irreconcileable. The former also considers that the 437 yards 2 feet at Middlesborough corresponds to the upper group in Ormerod's section of 700 feet, given above. At the bore-hole at Middlesborough the strata proved shows—

Drift	Feet 70
Upper red marl, with gypsum	89
Red sandstone	900
Ditto, with saliferous marls, marlstones, and limestones ...	147
Rock salt	100
Saliferous marls and limestone, mixed with rock salt	7
Total	Feet 1313

No rock salt appears to have been met with in the upper red marls in the bore-hole, but only gypsum, which, as we have before stated, is the usual accompaniment of rock salt. The 900 ft. of red sandstone bored through at Middlesborough is found to be above the rock-salt, and the natural conclusion is that it is identical with the bunter, or upper new red sandstone of Cheshire, and that, therefore, the saliferous formation of Middlesborough is not identical with that of Cheshire, the latter being associated with the Keuper red marls, and that of Middlesborough with the Permian marls and lower red sandstone. But, despite differences of opinion as to the nature of the formation itself and the strata above and below it, we have the fact of the rock-salt itself being under the ground, and the next important object should be to trace as far as practicable its actual extent. We are told that the dip at Middlesborough being slight the red sandstone there will extend a long distance towards Hartlepool, but the sea intervenes, so that the first strata which appear near to Hartlepool are the red marls, with occasional contortions, caused probably by the solution of the rock-salt. Below these red marls the great bed of magnesian limestone emerges. Whether the rock-salt deposits in the lower red marls will be found coextensive with the magnesian limestone in Nottingham, or whether the deposits at Middlesborough are only local, and may become wholly or partially substituted elsewhere by magnesian limestone where it is fully developed remains to be proved. The general opinion is that in Cleveland the area in which the salt will be found is most extensive, and will well repay opening out and working, for in the Cleveland Hills, further in the dip than where the bore-hole was made for Messrs. BOLCKOW and VAUGHAN, there is the lias, and in the intermediate space gypsum has been worked, and, as we have before stated, salt is always found to be accompanied with gypsum, which has led some chemists to suggest that the consolidation of the two must have been effected in such cases by heat. But there is every reason to believe that rock-salt exists in many parts of the kingdom, and will ultimately be proved, in all probability, when something else is being bored for or sunk to, for Mr. DICKINSON says it would be premature to say that rock-salt has existed along the entire range of the upper red marls between Rugby and Cleveland, or whether it only comes in near Rugby in connection with the Cheshire, Staffordshire, and Worcestershire range. But whether it is or has been continuous in both the upper and lower, or only in one set of the red marls, it is possible that many of the landslips which have occurred along that range may be due to its solution. But so far as Cleveland is concerned we agree with Mr. PEACOCK that there is a great future for it in connection with the raising of salt. His views, too, have been endorsed by very high authorities, for the chief of the Geological Survey, in writing to him on the subject, said—"I always supposed the salt (Cleveland) reached was in the Keuper beds, and your section would tend to confirm that idea, for the shaft only touches at the bottom the water-stones, which belong to the lower secondary portion of the Keuper series."

It will be evident to those who have paid even a little attention to the subject that the working of salt can be made most profitable, seeing it is generally very thick where deposited. In Cheshire the total thickness of rock-salt, including all the beds and lumps, is about 180 feet at Northwich, and 210 feet at Winsford. According to the last return (that of 1877) the quantity of salt of every description raised in the United Kingdom was 2,735,000 tons. British India and the United States have been our largest customers, our exports in the year named having reached 833,862 tons, of the average value of 11s. per ton. Like every other mineral, however, the value of salt has come down, for in 1855, when our production was only 1,094,770 tons, the average at the works was 24s. per ton. Salt can be made far more profitable than coal, whilst there is nothing like the competition with respect to it, there being markets for all that is raised or made, and what is now about to be done in Cleveland should stimulate similar operations in other districts where salt or brine is known to exist. Thus we are told that near Horncastle, in Lincolnshire, in the kimmeridge clay (so well known for its gas-producing qualities), near its junction with the greensand, a bore-hole was put down which penetrated some distance into the red Keuper sandstone, and at a depth of about 380 yards a valuable saline spring was discovered, whilst at the Duncrue Mine, Carrigfergus, Ireland, now being worked, the salt was found whilst boring in the expectation of finding coal. Indeed, the working of salt appears to be about the most profitable in connection with any of our minerals, and it is to be hoped the result of the working at Middlesborough will be such as will lead to a marked extension of the salt industry.

UTILISATION OF SULPHIDES AS FUEL.

THE HOLLWAY PROCESS.

In fulfilment of the notification published in last week's Journal an experiment was made on the night of Tuesday last at the Atlas Works, Sheffield—Messrs. John Brown and Co. (Limited)—on Mr. Hollway's method of treating cupreous pyrites, and as this process has of late created considerable stir in scientific and metallurgical circles we are happy to be able to lay before our readers a full and exact account of the proceedings. We may as well first mention that the claim of Mr. Hollway's patent is the "Utilisation of sulphides as fuel by means of rapid oxidation," or, in other words, he causes the copper-bearing pyrites ore to give off its sulphur, to become molten, and to lick up the needful quantity of silica to form a slag, so as to allow of a settlement of the regulus, and all this simply by the aid of a blast of air, without using carbonaceous fuel, except at starting. We read the description given before the Society of Arts by several gentlemen who had seen these operations, but were quite unprepared to find that so unpromising-looking a material as ordinary pyrites could be burned so freely, and be made to flow like water.

There were present—Professor Roscoe (who did not, however, remain during the night); Dr. Marshall Watts, of Giggleswick College; the Hon. Edward Coombs, of New South Wales; Dr. Grimshaw, U.S.A., and Mr. Justice, U.S.A.; Mr. Norman C. Cookson, of Newcastle; Mr. J. Fenwick Allen, St. Helen's; the Editor of Iron; Messrs. J. H. Collins, of Truro; W. Terrell and A. S. Merry, both of Swansea; J. E. Stead and R. Howson, both of Middlesborough; H. C. France, of Messrs. Chance Brothers, Birmingham; Dr. Schweeder, chemist to Sir Josiah Mason; Mr. H. Heywood, F.C.S., of Cardiff; Messrs. Greenway and French, chemists to the Sheffield Smelting Company; Messrs. A. H. Allen, F.C.S., and H. S. Bell, F.C.S., of Sheffield; Messrs. T. Blair, W. Eaves, W. Galbraith, and E. Richards, of the Atlas Works; Messrs. P. Hodges, W. Naylor, and J. Lean, of Messrs. Cammell and Co.; Mr. Arthur Cooper, of Messrs. Brown, Bailey, and Dixon; Mr. S. G. Thomas (Messrs. Thomas and Gilchrist); Mr. E. Riley, F.C.S.; Mr. Hill, F.C.S., late manager of the Canada Copper Company; Mr. Percy Tarbutt, F.C.S.; Mr. McLeod, of London; Mr. Hatfield, of Attercliffe; Mr. J. Heaton, of Dodworth; Mr. Parkes, sen., F.C.S., of Birmingham; Mr. Miller, secretary of the Society of Engineers, of Glasgow, and several others.

The experiment was made in a set of ordinary cupolas, and the blast supplied was that which had been laid down for the pit originally. The cupola, which was used as a crucible, had been altered for the experiments. The pedestal on which it had stood had been removed from under it, and it was supported by four steel ingot moulds, while to the base of the hearth was attached (just as to a converter) an ordinary Bessemer tuyere hearth and blast-box. The crucible, we were informed, was 3 ft. in diameter, and the hearth contained six ordinary tuyeres. To the front of this cupola was affixed an iron box some 8 ft. high, lined with gannister, and connected by a channel from the level of the hearth, 2 ft. high by 1 ft. broad, while the bottom of the receptacle and the tapping-hole for the regulus was 2 ft. below the tuyere hearth. Above the tapping hole for regulus was another at the level of the crucible hearth, and a third at the top, so as to give a bath or mass of metal some 4 ft. 6 in. deep upon the tuyeres, and consequently 6 ft. 6 in. in this receiver. Into the cupola the ore was fed by means of an ordinary bell and hopper at the height of about 16 ft., and just underneath a horizontal brick culvert conducted the gases into the adjoining cupola, No. 2, where they were met by a powerful jet of water, and from the base of this another drain or culvert led the uncondensed gas on into the third and fourth cupolas, where there was more water to meet and cool them, so as to avoid their passing into the atmosphere. All this water ran away into the Bessemer pit behind, and no account was taken of the sulphurous acid which it contained. The first and second cupolas were covered in at the top, the other two were open.

The pyrites and the sandstone were charged into the furnace in the proportion of ¼ cwts. of sandstone to each ton of pyrites, and the slag produced was very fluid, being as liquid as water. When cold it appeared very dense and crystalline, specific gravity being 4·1, but in no case could any entangled regulus be detected, which clearly proves that the slag must have been very hot and liquid, as there was only a slight difference between its specific gravity and the specific gravity of the regulus.

The operation of charging the furnace commenced at 9·15 P.M., with pyrites. About 1 cwt. of charcoal was added with the first ton. At about 10·15 P.M. molten metal was observed running from the lower tap-hole of the receiver, which was immediately closed, and pyrites and sandstone, without any carbonaceous fuel, were then added at the rate of 3 tons of pyrites per hour. The rapidity of the charging was steadily increased, so that before midnight the ore and sandstone were being introduced at the rate of about 1 ton of pyrites and 4 cwts. of sandstone every 12 minutes. This rate of charging was based on a calculation made of the cubic feet of air passing in under the pressure of blast maintained, so that the whole of the oxygen might be consumed and free sulphur be distilled. At 12·30 A.M. the slag commenced to run out of the receiver, and at 12·50 the slag begun to run very rapidly. At 12·55 it became a perfect torrent of very liquid molten matter. This continued until about 1 A.M., and at 1·5 A.M. the furnace appeared to be empty. The regulus remained behind, and was afterwards tapped out.

The cause of this emptying out could not at once be ascertained, as the culverts and cupolas were too hot to permit of examining them, but as the cover of cupola B was found to have been displaced by the pressure the accident had been evidently caused by the outlet for the gases being closed, and this was, later in the day, found to be the case, for a large quantity of sulphur was found accumulated at the bottom of the first condensing cupola, which choked the outlet and prevented the gases from passing off. This caused a back pressure in the furnace, causing the molten metal to pass out at the slag-hole, but the regulus being below the tuyeres in the quiescent hearth remained undisturbed.

Examining the results about midday we were considerably astonished to find so large a quantity of sulphur condensed, considering that so much had been burned during the night in the receiver previous to its filling. This sulphur was quite black, being of a plastic or viscous nature, intermingled with cement, mortar, and such like, washed down mechanically by the jets of water from the insides of the cupolas. In the culvert along which the gases first passed was found pulverulent matter caked together on the sides; these proved to be zinc and arsenic.

The unanimous opinion expressed by the copper-smelters and practical metallurgists present was that the contents of the furnace were so hot and liquid that it would be advisable in future to add with the pyrites a very much larger proportion of incombustible materials, it was stated that by so doing a slag might be produced of about specific gravity 3, which, if sufficiently basic, would not contain more than 0·1 copper.

We understand that a further discussion on the merits and application of this process will be held before the Society of Arts, on April 30, when doubtless many points of interest will be ventilated. Meanwhile we hear of negociations in progress for the erection of plant on a considerable scale for treating some suitable deposits of ore in Norway.

OUR RAILWAY IRON ABROAD.

It cannot be said that there is anything very hopeful at present in the aspect of our exports of railway iron. The shipments in March amounted to 37,197 tons, as compared with 36,294 tons in March, 1878, and 30,078 tons in March, 1877. The Russian demand was feeble in the extreme in March, but considerable shipments were made to Brazil, British India, and Australia. To Brazil, for instance, we sent 5532 tons of our railway iron in March, as compared with 2078 tons in March, 1878, and 1724 tons in March, 1877. India, again, took 14,464 tons of our railway iron in March, as compared with 5405 tons in March, 1878, and 9831 tons in March, 1877; and Australia 9784 tons, against 7718 tons and 6004 tons respectively. If we extend the comparison to the first three months of this year we find British India standing at the head of countries or colonies forming our external customers for railway iron. Thus, that vast and interesting quarter of the world took 31,088 tons of our rails to March 31 this year, while the corresponding shipments in the corresponding period of 1878 were 38,594 tons, and in the corresponding period of 1877 16,800 tons. The Australian colonies, including New Zealand, ranked second as external consumers of our rails, having taken 19,235 tons to March 31 this year, as compared with 19,673 tons and 12,774 tons in the corresponding periods of 1878 and 1877 respectively. Brazil came third this year with a consumption of 10,781 tons, as against 5320 tons and 6450 tons in the corresponding periods of 1878 and 1877 respectively. To Russia the exports of railway iron to March 31 this year amounted to only 29 tons, but Sweden and Norway took 5244 tons, and Spain 4169 tons. It is, perhaps, noticeable that, notwithstanding the severe prohibitory duties imposed by Congress, the imports of our railway iron into the United States have somewhat increased this year, having risen to 1184 tons to March 31, while the corresponding imports in the corresponding period of 1878 did not exceed 109 tons, and in the corresponding period of 1877 762 tons. Perhaps our exports of railway iron to the United States may be carried to much larger figures, as intelligence has reached this country that Mr. W. H. VANDERBILT, the American railroad king, has just made a rather considerable purchase of steel rails on this side of the Atlantic.

The low prices prevailing for our rails do not appear to have exerted much influence upon the foreign demand, but it has probably sensibly stimulated the consumption of our railway iron in British colonies. It is not a little remarkable that of the 85,751 tons of railway iron which left our shores to March 31 this year no less than 50,950 tons, or five-eighths of the whole, went to the three colonial groups of British America, British India, and Australasia. Notwithstanding the strain upon the revenues of India occasioned by the Afghan war, the low rates at which rails are now obtainable have induced the Anglo-Indian Government to proceed with energy and vigour with the construction of the projected group of Indian State lines. In Australia, again, the work of railway development is being steadily prosecuted, and the cheapness of rails materially assists the various Australian Ministries and Parliaments in the carrying out their plans. Canadian railway credit is so dreadfully feeble that it has not been possible to do very much in the matter of railway iron in British America, but the Canadian Government has, nevertheless, let contracts for the construction of several sections of the Canadian Pacific Railway, and it has, doubtless, been encouraged to do this by the cheap terms upon which permanent way *materiel* can now be procured. Recent events which have been passing in Cleveland, and which point to a future supply of steel rails at extraordinarily low quotations, seem to presage an increase in the external demand for our railway *materiel*, unless, indeed, the experience acquired in the past is to be regarded as valueless.

WASTE OF CAPITAL IN MINING OPERATIONS.

Mr. W. Y. CRAIG, the President of the North Staffordshire Mining Institute, delivered an able address to the members of that Institute on the above subject at Stoke-upon-Trent, on Monday evening. At the previous meeting of the Institute he had pointed out the great loss of capital involved in the colliers working irregularly, and he now dwelt on the loss occasioned by underground cleaning and the screening of coals on the bank. He said his attention was called to the waste arising from screening at a time when he contemplated altering the method of working, so as to avoid the necessity of reducing wages. He felt that the seam which was being worked at Podmore Hall ought to produce a larger proportion of round coal than was being sold, and that the excessive breakage arose from blasting, or, rather, the excessive use of powder. In order to get rid of that, and to prevent the continued conflict between the firemen and the colliers, he arranged to pay the colliers upon the round coal alone, and give them a loading price for slack. But after that had been tried a fortnight he found that it gave the workmen an enormous rise, and the small coal was not materially reduced. Directing his attention to the screens, he found that he was paying upon round coal loaded underground, though he had deduced the price to be paid for the round coal to be produced at the screens. He was aware that it was in favour of the men, but at the time he was not aware to what extent in was in their favour. To arrive at a correct knowledge he started a series of experiments, which extended over six weeks, and he had the checks so complete as to prevent the possibility of error as to the amount of slack made by screening. He had also lately directed very close attention to the cleaning of coal below ground, particularly in South Wales. In the first place, it was arranged that the men should send up the coal clean; and in the second place, they had screens, and took out the dirt sent out inadvertently. In South Wales he found underground cleaning was carried on to a very high point towards perfection, and that the coal was sent out of the pit in such a condition that little was required to be done by screen. In Aberdare Valley there were only two screens for 800 or 1000 tons a-day.

Although the South Wales coal was, perhaps, easier to get than any other coal, yet the system of working was most expensive. The mode of working was generally the longwall, stalls 12 yards square. The quantity sent out of one square at one colliery by two men was 5 to 7 tons per day; at another colliery the quantity was 10 to 14 tons. At the former colliery cleaning was supposed to be perfect, and there were only two screens above ground, where the cleaning appeared to be a farce. He found wherever 10 tons could be got out of a place by two men in a day the cost of production was considerably lessened. From enquiries made on the spot two men could send out 2½ tons more per day if it were not for the cleaning. It was evident, therefore, that there was a serious error arising from insisting upon so much cleaning underground as they did there. This error could only be perceived by a practical man giving special attention to the subject. If he began with the assumption that

the coal ought to be sent up clean a mere logician would say anything short of absolute cleaning would be inadvertence or mismanagement; but absolute cleaning would have to be paid for at an enormous loss. The price at the colliery to which he had referred was 1s. 6d. per ton for getting coal and putting it into the tub: 7 tons per day would be 10s. 6d., or 5s. 3d. for each man, which was about the wages the men made when in full work, but at present they were suffering from severe depression. Now, he was perfectly satisfied that 3 tons more might be sent up, because at another colliery in the Rhondda Valley they had reached as high as 10 tons, and it was not unusual to get 14 tons. The tendency would be to narrow the area of working. He was aware that in that district the roofs were bad, and heavy timber was required. It necessarily followed that any restriction in area must result in lessening the cost of timbering the road and keeping down all the fixed charges incidental to roads and roofs. Hence, by sending up 10 tons instead of 7 tons, they would be able to get a quantity that the pit drew over an area or length of face one-third less than at the present time—7 tons at 1s. 6d. produced 10s. 6d.; 10 tons at 1s. 1d. would produce 10s. 10d. If they deducted from the getting price something like 5d. per ton, leaving the colliers as well off as they were at present, by abandoning the clearing to a certain extent, there would be a saving of that 5d. in addition to the saving effected upon the timbering of the roof and other incidental expenses. The whole cost of that superfine cleaning of coal underground amounted in that district to 9d. per ton. It seemed strange that such a fact should have escaped observation, and that closer attention had not been paid to it. But coal in South Wales was singularly clean; the district was free from faults, and the coal was easy to get, so that they could easily understand why so few screens were erected at the old collieries there.

In North Staffordshire they had as difficult a coal to clean as any in the kingdom. At the colliery with which he was connected they had bands in the coal, and at his colliery they arranged that the men should send the coal up free from bands, but a large amount was tipped away every day. Some years ago if he had insisted on the men taking out every piece of band, as they did in South Wales, the prices would have been increased considerably. Consequently, as long as it was not excessive nothing was said, and the bands were taken out easier on the pit's bank than underground. He then gave the result of minute calculations to show that the cost of underground cleaning was much greater than cleaning on the bank. He explained that prejudice and fear of strikes had prevented any alteration of the carrying of the cleaning to a superfine point, instead of adopting "the happy medium." But now men were working only three days a week, the leaders of the men would have intelligence enough to understand and see how prejudicially the present system was both to employers and workpeople. With regard to the waste from screening, he said from the tests which he had instituted he had ascertained that 11 per cent. of the coal was turned into slack by the process of screening. Now the price of slack was 3s. a ton and round coal 7s. 6d. per ton, so that there was a loss of 4s. 6d. per ton on 11 per cent. of the whole product in that way. Some time ago the Cannock Chase colliery-owners repudiated the idea of screening, and all their coal was hand loaded. He was satisfied that there yet remained much to be done in regulating the arrangements underground to determine how far cleaning ought to be carried on underground, and how to separate the coal from slack was to save the smashing by screening. In the course of a discussion on the subject of screening, the President said at Podmore Hall Collieries a saving of 4 or 5 per cent. in the proportion of slack made by screening had been effected by side tipplers and wood lagging.

DYNAMITE AND LITHOFRACTEUR.

THE BRITISH DYNAMITE COMPANY *v.* KREBS AND OTHERS.

This was an appeal from an order of the Lords Justices of Appeal, dated April 5, 1878, reversing an order made by Mr. Justice Fry on the hearing of the action on June 5, 1877, granting an injunction to restrain the defendants from importing, using, or selling lithofracteur, which is a kind of dynamite, during the continuance of the patent granted to Mr. Newton, the agent of Mr. Nobel, the inventor of dynamite. On the original hearing of the cause, which lasted several days, numerous scientific and practical witnesses were examined at length before Mr. Justice Fry, and his lordship delivered a very elaborate judgment, holding that the patent, the validity of which was disputed, was a good and valid patent for a new, useful, and very valuable invention, and that lithofracteur being a compound consisting of or containing nitroglycerine, absorbed in porous non-explosive substances, was an infringement of the patent, and he granted an injunction against Messrs. Krebs and Co., with costs, and directed an account to be taken to ascertain their profits, and the damages the plaintiffs are entitled to.

From this order of Mr. Justice Fry the defendants appealed, and on the hearing before the Master of the Rolls and Lords Justices James and Thesiger, in April, 1878, they held that the mode of manufacture, as described in the specification of the patent, was insufficient, and consequently bad, and they reversed the order of Mr. Justice Fry, and dissolved the injunction, and dismissed the action, with costs.

The plaintiffs having appealed from this decision of the Lords Justices, the case came on and was fully argued before the House of Lords for six days at the latter end of February last, the Lords in attendance being the Lord Chancellor, and Lords Hatherley, Penzance, and Gordon. Mr. Aston, Q.C., Mr. Cutler, and Mr. Chester appeared for the appellants, and the Attorney-General, Mr. Macrory, and Mr. Nalder for the respondents.

Their Lordships having taken time to consider their judgment now delivered their unanimous opinion that the evidence of the utility and value of the invention, and of the sufficiency of the description of the mode of manufacture as set out in the specification, was conclusively proved to be sufficient for all practical purposes, it having been shown that dynamite had in fact been manufactured from the instructions contained in the specification, and which evidence the Lords Justices had in a great measure disregarded, relying on their own opinions that they, not being practically acquainted with the subject, would not themselves be able to manufacture the finished article without some further instructions than the specification contained. Their Lordships now held that the Court below ought to have been guided by the evidence adduced in the action, and they allowed the appeal, and reversed the order of the Lords Justices and affirmed the judgment of Mr. Justice Fry, and continued the injunction granted by him; and they ordered the defendants to pay the plaintiff's costs of the appeal, and all the costs of the previous litigation, including the costs of the original hearing and of the appeal before the Lords Justices.

COAL EXHIBITION IN RUSSIA.—It is reported that the Minister of Railways has resolved shortly to institute an Exhibition of coal at Moscow. The measure has been suggested to him by a report recently furnished by the mining engineers Avdakoff and Gorloff, disclosing the wonderful wealth of the carboniferous deposits in the Government of Kharkoff, and urging him to develope them, on the grounds that the native coal is superior to that brought from abroad. Coal merchants from abroad will be invited to send in specimens of every kind furnished by their respective countries, and a public trial will take place to determine the relative value of foreign and Russian fuel. The experiments will be watched with great interest in Russia, as in all the cities throughout the European portion of the empire the inhabitants are rapidly replacing the use of wood for fuel by coal, and the question of a national coal supply is becoming of more importance every year.

JOINT-STOCK COMPANIES.—A return has been issued of the names, nominal capital, paid-up capital, and number of shareholders of the limited and unlimited banks, unlimited insurance companies, and miscellaneous unlimited companies which have been registered under the Companies Acts, 1862-7 and 1877, and are believed to be still in existence. There are 80 limited banks, with a nominal capital of 76,787,326*l.*, a paid-up capital of 19,276,292*l.*, and 38,810 shareholders; 53 unlimited banks, with a nominal capital of 66,806,100*l.*, a paid-up capital of 22,675,215*l.*, and 51,601 shareholders; 129 unlimited insurance companies, with a nominal capital of 30,842,500*l.*, a paid-up capital of 2,705,633*l.*, and 12,667 shareholders; and 95 miscellaneous companies, with a nominal capital of 4,321,388*l.*, a paid-up capital of 3,613,178*l.*, and 5862 shareholders. The total number of the unlimited companies is 277, the nominal capital 101,969,938*l.*, the paid-up capital 28,994,026*l.*, and the number of shareholders 70,130.

THE IRON TRADE IN SCOTLAND.—The Langloan Iron Company (Messrs. Addie), after fully testing their new blast-furnace—the largest one in Scotland—on the close-top principle, have accepted contracts for the erection of another on the same principle and of the same size, which will add very materially to the extent of their daily casting power when it is in full operation. Besides the Clyde Tubeworks, the North-British Ironworks, and the Tin-plate Works all being in full swim, Mr. Hudson, of Coatdyke Boilerworks has all hands employed on pretty heavy orders for his patent malleable iron beams and girders; whilst Messrs. Nicholson and Co., Sunnyside, are engaged with a large contract for locomotive boilers, and the Speedwell Works are in great activity with large foreign orders.

REPORT FROM CORNWALL.

April 10.—Mining affairs have settled down into what may be regarded, contrasted with recent fluctuations, as a tolerably equiescent state. This, however, was only to be anticipated, independent of all after considerations at the present season, and it will be certainly a week or so yet before we can expect to see a definite move. Still there is no doubt whatever that this move will be of an upward character, which is shown clearly enough by the way in which shares generally are held. There is very little disposition under existing circumstances to sell, for it is very well understood that there is likely to be nothing lost by waiting. At present appearances seem to point in the way of another established rise within the next three or four weeks, though it may be postponed until later on in May.

There seems to be little decrease in the amount of distress in Cornwall, which still continues to call for the strenuous efforts of the Relief Committee. Much is being done in the way of providing employment in road making, quarrying, and reclaiming waste, and where it is necessary the committee help these objects by a grant in aid. At their recent meeting the Lord-Lieutenant, the Earl of Mount Edgcombe, made some practical suggestions under this head. He said the Central Committee would have as much as possible to keep itself informed as to what was the state of the distress throughout the county. Those who lived near and could attend and represent their cases were likely to get more than their share; but the general committee's wish was to stimulate the exertions of the local committees, and to get them to give all the information they could, and he, therefore, moved that the sub-committees be requested to send in reports not less than once a fortnight of the state of their districts, whether there be distress or not, with any suggestions that they might have to make, and that the secretary be requested to send a copy of the resolution to each of the sub-committees. It would be desirable that the secretary should write to the principal landowners and employers of labour throughout the county, asking them to offer any suggestions for assisting in public work, and whether any combination could be arranged for providing employment. There might be many cases in which such suggestions would be made at once, when it would not occur to them unless they were asked. The work must be a work of public utility, and not a work which would be a benefit to any individual. He thought their labours would be regarded in an invidious light if it was regarded as assisting any private individuals. Possibly there might be some cases which would be worthy of consideration, such as working tutwork in a mine.

From Illogan it has been suggested that the unemployed should be set to work at road improvement. In Penzance district there has been improvement. At Helston there is greater need than ever, and 350 families require relief. Reclamation has ceased, but 6d. a day was allowed per man towards opening up a quarry. Camborne appears to be regarded as a kind of refuge for the destitute, and there a vote was made towards aid in making a new road. Camborne has 63 men out of work; Gwennap and Illogan have between them 260 families requiring relief. Redruth also has asked for a vote in aid of making a new road. At St. Agnes there are 40 men out of work. At Kenwyn 53 men are employed on a public improvement, and here also a grant in aid was made. Some grants were made to enable wives and families to join the husbands and fathers abroad. This brief outline will serve to indicate the scope and character of the distress at present.

As a curious illustration of the manner in which new lodes are discovered we may cite what recently happened at St. Blazey, where in making excavations in connection with a house the workmen engaged struck on the back of a copper lode, which gives every indication of being rich. This used to be a good mining district, and it is possible that we may see something in the shape of a revival.

One might have thought that the recent condition of affairs would have brought grist to the mill of the Stannary Court, but it appears the depression has reached there also, and there is to be a reduction in the staff. Of course, the explanation must be that the shaky mines are pretty well weeded out. However, miners would be better pleased if the Court was idle, and adventurers are not likely to feel much sympathy with its decline.

REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

April 9.—The quarter which has now come to a close has not been so satisfactory for the pig and finished iron makers as it promised when the year opened: 3*l.* 5s. for all mine hot-blast pigs, and 4*l.* 5s. for cold-blast sorts, short-weight, has been the figure which has regulated sales by first-class Shropshire and Staffordshire houses. Common cinder iron has ranged from 2*l.* 2s. 6d. down to 38s. Those finished iron makers have had most to do whose works are adapted to the rolling of sheets. Plates have been in dull sale. Bars produced by high-class firms have been in tolerably steady demand: 7*l.* 10s., with the customary 12s. 6d. per ton extra, for Round Oak make has been the price which has regulated the sales of marked bars. Sheets (singles) have mostly varied from 8*l.* to 7*l.* 10s., and in some cases 7*l.* But first-class brands have fetched 10*l.* From 9*l.* to 9*l.* 10s. and 10*l.* has been the quotations for plates of the sizes chiefly used. Bars of a common unbranded sort have stood at 6*l.* and 5*l.* 18s. per ton. At the quarterly meeting in Wolverhampton to-day prices were declared unaltered, and business was quiet.

Capitalists largely interested in the trading prosperity of South Staffordshire subscribed yesterday afternoon, in Wolverhampton, about 6000*l.* as security to bondholders prepared to lend money upon the mortgage of the Tipton district rates; and other guarantors are expected to be induced to come forward until from 25,000*l.* to 30,000*l.* can be seen. That amount secured, the commissioners will be able to keep on the eleven pumps which they had given notice to be closed. Meantime, the notice will be suspended. Intense relief was being expressed by Black Country traders last evening.

The Chillington Iron Company's annual meeting was held in Wolverhampton on Tuesday, Mr. G. J. Barker, the Chairman, presided, and said that the directors had been compelled to follow their competitors in reducing their prices. Their Leabrook Works had been idle during the greater part of the past year, or the company would have made a profit instead of a loss. With regard to the future he was very hopeful. The report showed a loss upon the year of 4072*l.*, and no dividend was, therefore, proposed. Mr. Riley, of Leamington, criticised the balance-sheet; he complained that more details were not given. The Chairman said that while the directors thought it undesirable to give information publicly for the benefit of their competitors, they would willingly give it to any shareholder who would go to the works for it. The report was adopted.

The Horsley Engineering Company (Limited), of Tipton, have issued their report for the year ending Dec. 31. It shows a net profit of 4242*l.* on completed orders only, which has been carried to the next year's account. In the depreciation and reserve funds there is a disposable balance of 2498*l.*, which will be distributed *pro rata* among the shareholders in July next. "The fierce competition," says the report, "which has to be encountered in every department renders it impossible to secure work at more than a bare profit."

On Monday a petition was filed in the Stourbridge County Court on behalf of Messrs. Mobberley and Bayley, coal and fire-clay masters, and brick manufacturers, of Cradley Station Colliery, and the Thorne, the Lye. The total liabilities are estimated at 21,000*l.*, with assets unknown. The firm have lately lost a heavy arbitration case, in which the Whitehall Colliery Company were the plaintiffs.

Coal and iron properties upon the local stock exchanges remain stationary. The original issue of the Sandwell Park Colliery shares are quoted by holders at 4 premium, and the new issue at 3½ premium. Sellers in the Pelsall Coal and Iron Company stand at 10½ dis., but buyers demand a further 1 per cent. off. This concern, it may be mentioned, is about having sunk a new pit shaft about 50 yards under the yard coal. The Chillington Iron Company's property is quoted by buyers at 8 dis. The Staffordshire Wheel and Axle shares are priced by buyers at 1½ dis. Those of the Patent Shaft and Axle-Tree Company have sold at 4⅛ dis. The original issue of Muntz's Metal Company is priced by sellers at 4½ premium, ex div. For the original issue of the Birmingham Wagon Company there are offers at 3 premium; and buyers of the shares of the Railway Carriage Company (Limited), Oldbury, stand at 1½ dis.

Acceding to the men's request the ironmasters of North Staffordshire have been carrying on their works, and have held "an enquiry into the condition of the prices prevailing in South Staffordshire." The result is the reductions demanded are to be carried out, and the rates now offered to puddlers are 7s. for "mine," and 7s. 6d. for bulldog. The deputation of men who waited on the employers were told these rates were the same as those paid in South Staffordshire, and were more than those of the North of England for the same kind of work by 6d. per ton, and the masters further stated they could not afford to pay more; the terms, therefore, were accepted by mass meetings of the men. The reduction will affect chiefly puddlers, shinglers, and rollers. The employers have shown much determination during the dispute, and have stated, considering their stocks, they could do without puddlers for at least two years in the present condition of trade.

About a thousand colliers employed in six pits at Burslem on Monday received a fortnight's notice, with an intimation that wages will be reduced 10 per cent. This is in addition to the drop of 5 per cent. made three months since. The men have resolved to resist the notice and bring up their tools, and further to stand out for a 5 per cent. rise.

TRADE OF THE TYNE AND WEAR.

April 9.—The Steam Coal Trade has somewhat improved, the demand for export having become more animated; this has enabled some of the works to be kept going nearly full time, but others are very much depressed, and some only make three or four days per pay. As we have often noticed, reductions are likely to be sought in the rates of the Northumberland miners, and now notices have been served at some of the works to make those reductions. This has been done at the Backworth, Cramlington, and Delaval Collieries, and others are likely to follow the example. The strike which took place in Durham on Monday has already had a considerable effect on the Northumberland trade, and at many of the works orders have been received that will keep them going for some time to come; indeed, some of them have been obliged to refuse more orders at present, and the orders offered have been transferred to other parties. The shipments of gas and other coals at the Tyne Dock during last week were very large, partly owing to the strike anticipated, and on Friday and Saturday last the shipments were exceptionally large, but during the present week they have, of course, fallen off, and this will no doubt continue; but it must be borne in mind that at many of the works considerable stocks are held, and the strike will have the effect of clearing them off. Several of the large gas coal works are at full work; this is the case at Pelton Fell, Messrs. Dickenson's pits, in the Consett district, and others. The strike in Durham has caused much surprise, as it was generally considered that the bulk of the men would under the present condition of the trade accept the terms offered by the masters; this, however, proved to be a mistake, the bulk of the men in the Union having it appears determined to resist to the utmost the proposal of the masters to exact a reduction of 15 per cent. on underground men's rates and 10 per cent. reduction of surface men's wages. It will be recollected that the men offered to take a certain reduction, or refer the whole matter to arbitration, but this proposal was not acceded to by the masters.

Now that the strike has been fairly commenced it is difficult to say how long it may continue, but when works are kept open it is likely that considering the number of men who have been out of employment for some time many of those hands will be inclined to go in when it is possible to do so. But, on the other hand, it is certain that when a strike of any magnitude occurs there is a tendency towards extension, excitement, and a certain amount of coercion or intimidation certainly has this effect, and hence at many large works—Monkwearnoth, Silksworth, and others, where the men had accepted the masters' terms, and actually started work—they have come out since and joined the men on strike. Previous to the strike there was a large number of men out of employment, not less, it was supposed, than 8000, and now that the majority of those remaining in the Union have come out it is computed that not less than 30,000 men are out. At many of the works where a few men have gone in there is great excitement, and disturbances have also taken place, and violence of a most lamentable kind has been done to some of those hands. Tumults have occurred at Usworth, Hamsteds, and many other places, and some men have been seriously cut and injured, although as yet no lives have been lost.

The Quarterly Meeting of the iron and allied trades was held at Middlesborough, on Tuesday. There was a larger attendance than usual, including members of the trade from Scotland, Barrow, and the Midland districts. The uncertainty thrown over the iron trade by the possibility of a dearth of fuel, owing to the Durham miners' strike, caused makers to be stiffer in their rates, and merchants who wanted iron were generally ready to pay about 6d. per ton more towards the close of the market. Quotations were—No. 1, 38s. 6d. to 39s.; No. 3, 35s. 6d. to 36s.; No. 4 forge, 34s. 6d. to 35s. net. The net decrease of stock by about 2300 tons last month does not seem to have had any particular effect on the trade. The makers calculated on a much larger decrease, which they estimated would enable them to stand out for their prices. Taking Cleveland iron, there is a stock in the district equal to ten or eleven weeks make, which brings up the total to about 367,000 tons. The general impression, after the public exhibition of last Friday, that the steel question is solved, beyond doubt has given great satisfaction and increased confidence to the district, though it will be a long time before any real advantages can be expected to accrue from the discovery. That Cleveland in the matter of steel will take the same premier position as she has done in iron seems not to be doubted, though at the same time the opinion is expressed that Sheffield, Barrow, and the other steel districts of the country will in a measure suffer if steel, cheap and good as asserted, can be made in Cleveland. Manufactured iron is in much the same position. Work is scarce, and prices low. Plates nominally at 5*l.* are done for less, whilst bars and angles are about 4*l.* 15s., less 2½ per cent. There is a fair demand for some classes of foundry work. The chief exhibit was a stand of specimens of the new Cleveland steel, which had been powerfully tested. The steel was pronounced by practical men to be of the very highest quality. The most striking portions of the exhibit were the sections of heavy rail of about 72 lbs. to the yard, which had been bent, and in one case twisted, without the slightest giving way. A practical man spoke very strongly in respect of the high quality of the material. Without knowing which

was Cleveland and which hematite, in one case he pointed out what proved to be the Cleveland production as the superior of the two. In all cases the steel showed splendid features. One of the samples had been submitted to a force of 1 ton fall with three blows varying from 20 to 30 ft., and the impression made on it had been comparatively slight. Mr. Richards, the manager at Bolckow, Vaughan, and Co.'s, attended and gave some explanations. The steel had been planed and polished in some instances, and took a high degree of finish. There was also a sample of the brick which forms the lining of the converters, and which has largely contributed to the success of the process. Wood's patent sleeper, with rails attached, was also shown.

At the Whitburn new winning the shaft has been completed down below the water-bearing strata, and the metal tubbing also inserted. This shaft has been sunk by a Belgian method quite novel in this part of the country, the shaft being bored by a huge boring apparatus without interfering with the water, and when completed metal tubbing is inserted from the top to the bottom of the shaft. In this case this process has been completed, the depth being about 75 fms., and it is only now required to draw the water out of the shaft lodged in the inside of the metal lining, and afterwards the shaft will be sunk by the ordinary method (considerably improved upon) through the coal measures to the coal seams, which are here expected to exist in great perfection. Previous to adopting this method of sinking a large sum was expended at this place in the attempt to sink through the limestone from the surface, and although pumping-engines of enormous power were provided, and upwards of 10,000 gallons of water per minute was actually pumped, yet the sinking by this system had to be abandoned. The success of the Belgian or Chaudron system may now be considered complete.

REPORT FROM NORTH WALES, SALOP, AND CARDIGAN.

April 10.—I have just returned from a run through the slate districts of North Wales, and I am pleased to be able to record several signs of improvement. Shipments are more numerous from the Port of Carnarvon, and at Port Madoc, although the port is still crowded with vessels waiting for cargoes, shipments principally to the Baltic ports are numerous. The hope of a continuance of this revival in the foreign trade is, however, rather weak in the minds of quarry owners, for the representatives of the quarries on the continent of Europe send home rather doleful reports of the state of trade there. The home trade continues more depressed than the foreign. Some of the Carnarvonshire quarries have been kept going during the depression by the arrears of unexecuted orders. Orders having of late years had to be given a year or two, if not longer, in advance. In Nantle, Cilgwyn Quarry has kept fairly employed, so has Talysarn. Penyorsedd has recently booked some good orders. The transfer of the Cornwall Quarry, which adjoins the Dorothea, has, I belive, been completed, and it is probable that operations will be commenced with a view of working the quarry on a larger scale than hitherto. On the other hand, all the quarries from Dolgelly to Barmouth are idle. At the new quarry near Moel Terna, between Corwen and Llangollen, loading is going on, and the slates seem quite equal to any made in that district. There are also signs of trade at the works of the Llangollen Slate and Slab Company, near Llangollen. A good many slate quarrymen have emigrated to Canada, where they have obtained employment, as a commencement, as labourers. Some movement of the kind was necessary because of the number of men that were discharged from the quarries.

Mr. John Parry, the Chairman of the Slate Quarrymen's Union, has gone to America to "spy out the land," and arrange for the best methods of emigration and settlement for those who are still disposed to go. The paving sett quarries of the Gimlet Rock, Pwllheli, on the "iron bound coast" of one of the correspondents of the Journal, are busy. The proprietors of these quarries have similar quarries also at Penmaenmawr. At Penmorfa, near Port Madoc, the Queen's Quarry, belonging to Messrs. Stutchbury and Heathcote, has got fairly to work, and the firm are busy shipping their stone, chiefly to Bristol. The "correspondent" with the 4000*l.* burning a hole in his pocket might easily (and I daresay he will) find worse investments than paving sett quarries. None of them will pay 50 per cent., as Mr. Spargo enthusiastically anticipates, but if the right stuff is there, and it is properly worked, a modest profit may be made. Then as I said a few weeks back a larger number of skilled sett makers must be grown, and the remuneration must not be so disproportionately high.

At the collieries there are large accumulations of slack; but, on the whole, the house coal trade is as good as it has been for some time past. The closing of one or two collieries lately throws, as a matter of course, more custom into the hands of owners whose collieries keep working. The appeal of Mr. Thomas Savin against the decision of the Oswestry district magistrates, by which he was recently fined 500*l.* for damage said to be done to a road by his traction engines and wagons, came before the magistrates assembled in Quarter Sessions at Shrewsbury yesterday. The plaintiffs, the Oswestry highway board, agreed through their counsel to reduce the amount of the fine from 500*l.* to 150*l.*

REPORT FROM DERBYSHIRE AND YORKSHIRE.

April 10.—There has been but little change of late with respect to lead mining, only a few works making anything in the shape of progress, whilst the production of ore is still limited in quantity, and far below what it was in former years, but there is some prospect of an increase during the present year. Some of the barytes establishments are turning out a fair quantity of material. In the Chesterfield district, and along the course of the Erewash Valley, the coal mines up to a week or two since have done a fair trade, as there has been a fair demand for household fuel for most of the southern markets. London, in particular, during the year, so far as it has gone, has taken a much larger quantity of fuel than in former years, owing to the severity of the weather, but a more genial season having set in there has been a gradual decline in the demand, and prices are by no means equal to what they were in the early part of the year, and are now anything but remunerative, and there is no likelihood of any advance taking place, unless the strike in the Durham district should continue for any length of time, for the stoppage of a large number of collieries will, doubtless, have the effect of disturbing the trade, and in all probability lead to an increase of prices, as the freight for coal carried by sea is about one-third less than that charged by the railway companies carrying large quantities of coal to the London depôts. In steam coal there is now some prospect of an improvement, as the active season is fast approaching. In other descriptions of coal there has been no alteration for the better, the consumption of engine fuel in particular being still very moderate. At the ironworks between Chesterfield and Nottingham there are a considerable number of furnaces out of blast, whilst those that are in are more than amply sufficient to supply all the pig that is required. Mill material is not much enquired for, but some of the foundries are a little better off than they have been. At Dronfield business appears to be moving along steadily, and the place, now growing into a town, is perhaps, rather better off than most others, there being several branches of the iron and steel trades carried on there.

In Sheffield business remains in much the same state as reported last week, there being still a little more activity in some branches. Not much is being done in armour-plates, but at one establishment they are now making composite plates of iron and steel for Her Majesty's iron-clad the Inflexible. These plates are likely to be in good request, for they have stood some severe tests, being patented by Mr. A. Wilson, of the Dronfield Bessemer Railworks, who has paid a great deal of attention to the production of steel for various purposes. Bessemer rail makers continue to be well employed, but orders are now taken at a price that was scarcely dreamt of a few years since, while they are likely to come down much lower now that Cleveland pig can be converted into Bessemer. Tyres, axles, and marine material are in fair request. In crucible steel business is still quiet, although for wheels and other articles it is being actively pushed. The engine works have not at all improved, and it is said that in one instance the men refused to submit to a reduction of wages such as would have allowed the employers to take a very large order, but the result is that the contract has gone to Belgium, where the workmen are not so nice, and where they prefer moderate wages before total idleness. A few of the cutlery houses continue to keep their hands fairly going on the better class of goods, but there has been no improvement with respect to inferior table, pocket, and other knives. Sheepshears have improved in request, principally for shipment, and they are now produced by the introduction of machinery at a much less cost than formerly, which allows of our manufacturers being able to compete with all foreign makers. A moderate business is being done in ship and other plates, as well as hoops and bars, but the mills are not so fully employed as could be wished. Some of the edge tool grinders have given their employers a month's notice to leave, but it is not expected now that it will be acted upon, as a change has taken place in the situation since the notices were given. In the Britannia metal and silver-plate branches work is very scarce, most of the workmen being on short time. At the foundries in the town and district a steady business is being done in pipes and ordinary castings, but at many places the number of men employed is little more than half what it was formerly.

In South Yorkshire the Coal Trade is not by any means so brisk as it was, there having been a marked decline in the tonnage sent away of late to the London and southern markets, whilst many of the collieries are being worked at a loss, the only persons benefited being the workmen, and these grumble at the rate of wages they are receiving. The award of the umpire with respect to the 12½ per cent. reduction has not yet been made, but is now looked forward to with some interest. Should it be conceded it will barely keep the pits in a position to prevent a loss, for as things are it cannot, as a rule, lead to a profit. The Thorp's Gawber Hall Company find it fully as profitable to keep their pits standing as to work them at the old rate, and the men have evidently agreed not to concede all that was asked of them by the company. For several months past the demand for steam coal has been very dull, so that large stocks have accumulated at most of the collieries. There is, however, now some prospect of improvement, as the Baltic promises to be open at an earlier date than usual, so that the trade from Grimsby will commence early, and it is to be hoped that prices will rise in consequence, for this description of coal has been selling as low as 6*s.* per ton, which is less than it could be raised for by the colliery owners.

REPORT FROM MONMOUTHSHIRE AND SOUTH WALES.

April 9.—The local Colliery Owners' Association has been held at Cardiff. There was a good attendance. Mr. W. J. Lewis was elected Chairman both of the Association and the Council; Mr. Edward Coward, vice-Chairman of the Association; and Mr. Edward Jones, vice-Chairman of the Council.

Another public meeting has been held at Abercarn with reference to the recovery of bodies from the pit. A letter was read from Mr. Smith, the Secretary of the Ebbw Vale Company, in which he said, "This company is unable to incur any further expense for explorations, but they are quite willing to afford every facility to the promoters of any movement in the event of the necessary funds being previously provided." Further communications had passed, but pending a reply from the company with regard to starting the pumps an adjournment of the meeting took place. The question, it will be seen, thus resolves itself into one of whether the necessary funds can be obtained. It is doubtful whether the thousands required will be procured. By-the-bye, the Monmouthshire magistrates, on Tuesday, voted a gratuity of 25*l.* to the Coroner for his services in connection with the holding of the Abercarn enquiry. The inquest as to the Bedwellty explosion has been formally opened and adjourned. There is nothing new from Dinas; the explorations are proceeding satisfactorily.

Reports which come to hand from various parts of the district with regard to the Iron Trade are not of the most satisfactory nature. Now and again one hears of fresh orders lodged, but further enquiry generally leads to the knowledge that such orders are small ones; and, again, have had to be taken at a very low price. There is apparently a little more doing at some of the steelworks, but of late low rates for rails prevail. At an important establishment in the district the wages rate has again been reduced. Masters must, to compete with other districts, reduce the cost of production as much as possible. Railway iron sells slowly, but quotations have not further receded. Bars are in a little better request. Clearances of iron have been made to Smyrna (of about 1000 tons of bars) and to Bahia; and shipments will shortly take place to Canada. The Tin-Plate industry is materially unchanged, and it is satisfactory to note that late quotations are kept up.

The wages question will be brought before a delegate meeting of colliers to be held on Easter Monday. Circulars have been issued by the men's representatives asking for a full attendance, and pointing out how matters stand in regard to the proposals of the Associated Masters. There is one point in these proposals which is worthy of consideration by the men. It is that the masters are prepared, if the men will concede a 10 per cent. reduction from the beginning of the month, to guarantee not to make a further decrease during the year. The notices terminating contracts posted at New Tredegar meant, as suggested last week, a 10 per cent. decrease. The pits are the property of the Powell-Duffryn Company. The steam coal workers at the "Big pit" have agreed to go on at the lessened pay, but the men at the White Rose Colliery are "out," and ask to have the old rate continued until they see what the house coal collieries will do. There continues a moderately good demand for steam coal, but foreign shipments to a slight extent have fallen off. This remark, however, does not apply to coastwise clearances. There is not quite such a good enquiry on behalf of the Mediterranean and French ports. House qualities are not so active. Prices are stationary. Patent is materially unchanged.

THE TIN-PLATE TRADE OF SOUTH WALES.—The quarterly meeting of tin plate manufacturers was held at the Bell Hotel, Gloucester, on Wednesday. Mr. G. B. Strick presided, and there was a very large attendance of representatives of firms in Staffordshire, Worcestershire, and South Wales. The first business had reference to the resolution passed at the last quarterly meeting:—That in future the rate of plates in charcoal and coke qualities be—doubles, 2*s.* per box less than 20 by 14; 20 by 10 to be on basis of 14 by 10, with 6*d.* added; 12 by 12 to be the same as 14 by 10, with 6*d.* added; 28 by 20 (112 sheets) to be double 20 by 14, with 1*s.* added; all other odd sizes to be on the basis of 20 by 14, 14 by 10, 17 by 12½, or 15 by 11, with 1*s.* per box added. It was not decided to rescind the resolution so far as it applies to charcoal qualities, leaving the rates to relate only to coke qualities. A resolution passed at the last meeting, that the price quoted in Liverpool be in future a price delivered on the quay or alongside ship, but that all export dues be paid by the exporter, was unanimously confirmed, the formal resolution to that effect being signed by 35 firms, representing over three-fourths of the makers of the kingdom. A hopeful view was generally taken of the prospects of the trade, in consequence of the lowness of stocks both in this country and in America, and most of the members present appeared to be fully booked forward, both for charcoal and coke qualities.

At Pontypridd, on Wednesday, Thomas Jones, Hafod Colliery, was sued by John Hopkins for wages due upon driving a windway, in doing which he alleged that the men he employed encountered much greater difficulties than had been expected, which led him to request better payment than was at first agreed upon. John Jones, in speaking of the difficulty of the work, said there was a scarcity of air and an abundance of water. David Hopkins, overman, and brother of complainant, said he had agreed to pay complainant 14*s.* per yard for the heading and 4*s.* 6*d.* per yard for the windway, with 6*d.* extra after the first ten yards were driven. There was nothing said about payment for filling water—Mr. Abraham, agent at the colliery, said the windway had been commenced before he was awaae of it. He took one man away from the windway because Hopkins (complainant) was clamorous for all such jobs.—After some further evidence, the Bench gave a decision for complainant: 1*l.* 4*s.* 6*d.* for windway driving, and 13*s.* 3*d.* for work at water.—*South Wales Daily News.*

THE SUPPLEMENTARY SHEET.—We have received occasional complaints, and of late a good many, that the Journal is delivered by country booksellers without the Supplement. Subscribers would oblige us by demanding that the paper should be handed to them complete, as every Journal is accompanied by the Supplement when it leaves our office, and the fault of omission must rest with the country bookseller or their London agent.

THE CHEMISTRY OF COAL.

A most interesting lecture on this popular subject was delivered at Barnsley a few days since by Prof. THORPE, F.R.S., F.C.S., of the Yorkshire College of Science, Leeds. He commenced by remarking that wood was a complicated mixture of many substances, and had a peculiarly organised cellular structure, whilst in the cells were many substances partly liquid and partly solid. The bodies of which they were composed were sugar, starch, gum, cellulose, and lignose. In addition to carbon, hydrogen, and oxygen, the wood contained small quantities of sulphur and nitrogen combined with the organic matter, but the quantity of these substances rarely exceeded 2 per cent. The lower plants appeared to be similarly formed, for if they took the club moss, which was the only living representative of the vegetations of which coal had been formed, they would find it substantially the same as that of the trees. But there were certain subordinate parts of a plant which had a different composition to the main bulk of the woody fibre. These were the leaves, and particularly the seeds, or what played the part of seeds. The spores or seeds of the club moss contained a large amount of resinous matter, and it was because they had entered so largely into the composition of certain beds of coal, such as the "Better-bed," that the latter was so highly prized for the part it took in the production of the most famous varieties of Yorkshire iron. On examination that coal was found to be not perfectly homogeneous, for between the layers there ran a very thin substance known as mineral charcoal, which in all probability had been derived from the decay of the leaves and stalks of the vegetation from which the main mass of coal had been formed. Of all portions of a plant the greatest amount of mineral matter was found in the leaves, bark, and little twigs, the spores and woody matter of the stems of trees leaving comparatively little residue on incineration. The general character of the ash and mineral charcoal seemed to be tolerably uniform, and was composed chiefly of silica and alumina, with small portions of ferric oxide, lime, magnesia, sulphuric acid, chlorine, and alkalies. In the case of coal that furnished but little ash, they were justified in assuming that the whole of the mineral matter had been contained in the plants from which the coal had been derived, and the constituents of the ash itself served to bear out that supposition. The alumina, which was a characteristic ingredient of coal ash, was largely present in the spores, and also in the substance of the woody mass itself, and an aqueous infusion of the club moss was on this account formerly used by dyers as a mordant. Such trees as the oak and the birch had not the power of secreting from the soil the alumina which it contained, although they might grow side by side with the club moss, which had that power. But it had also been found that there were constituent parts of the ash of the club moss that were absent in the coal ash, and these in the process of decay would be washed away, for wood, when exposed to the rain and air, rotted until it became a powder.

The change was first of all due to the action of those substances containing a small quantity of nitrogen, which latter did not escape but formed ammonia, a substance which plants required for their existence. The change from woody matter to lignite in a bed of peat was both remarkable and instructive. In the upper layers the vegetable origin was easily recognisable, then lower down the tangled mass of vegetation became dense and dark, whilst at the bottom the peat was almost black, and the vegetable texture scarcely discernible, and became what was known as brown coal. From the brown coal they came to the ordinary bituminous coal, a change that was attended by an increase in the amount of carbon, and a decrease in the hydrogen, oxygen, and nitrogen. Some coals, more particularly those of South Wales, were valuable for steam purposes, whilst others classed as bituminous, although there was nothing strictly speaking of the nature of bitumen in them. The blacker and harder varieties of coal gradually merged into what was known as anthracite, which was composed of from 93·5 to 97·3 per cent. of carbon. The most careful experiments made showed that the transformation of woody matter was attended with a loss of 75 per cent. in weight. Wood decaying with free exposure to air and moisture evolved carbonic acid and water, but it was almost certain that the change of the vegetable matter into coal, even if commenced during free exposure to air, had not continued under these conditions. There could be little doubt, however, that the greater portion of the rotting matter had been covered at a very early stage with water and mud. By such means the process would go on at a much slower rate owing to the relatively small supply of free oxygen, the limited access of air greatly modifying the process of decomposition in another way. So if a stick were thrust into such a mixture of mud and rotten vegetable matter at the bottom of a ditch, a stream of gas bubbles would be disengaged, and occasionally ignite on the approach of a light with a slight explosion. These evolutions of an inflammable gas from swampy districts had been observed from the earliest times, and in some places the exhalations were so considerable and continuous that the flames of the gas had been burning for long periods. This marsh gas was made up of one part carbon and four parts hydrogen, and could be artificially obtained in many ways. It was highly inflammable, and burned with a bluish flame of feeble luminosity. When mixed with about eight or nine times its volume of air it formed an extremely explosive mixture, but when the proportion of air was increased to twelve or diminished to a sixth it was neither inflammable nor explosive. But there was a most essential difference between the process of woody matter in free air and under water—for in the first case they had the formation of carbonic acid and water, and in the other they had an additional production of marsh gas. A proof that marsh gas was actually produced in the formation of coal was afforded by the fact that it was often found in the atmosphere of coal mines, and was the fire-damp of the miner. Occasionally the coal was so highly saturated with the gas that it continued to escape from it for some time after it had been raised. Recently it had been found that from coal other gases could be obtained which were locked up in its pores, and the study of these gases and their nature was calculated to throw considerable light on the mode of their formation. The amount of gas contained in some coal was perfectly enormous—in the anthracite coal for instance, such as is found in South Wales, a pound of it would yield 154 cubic inches, whilst the steam coal yielded less, and the ordinary house coal less still. Fire-damp constituted one of the most formidable evils with which the coal miner had to contend, and in some pits it was only by constant watchfulness that the amount of gas evolved was kept below the point of explosibility. Providentially, fire-damp required a very high temperature to cause it to burn, for if when the gas was burning the temperature was rapidly lowered the flame was extinguished. It was because of this fact that the lamps of GEORGE STEPHENSON, the engineer, and Sir HUMPHRY DAVY, the chemist, could be brought into an explosive atmosphere with impunity. With respect to the burning of coal, the lambent flame seen playing over it in its red-hot state in a clear fire was due to the carbon monoxide combining with the oxygen to form carbon dioxide. Very little, if any, of that gas escaped unburned up the chimney under ordinary circumstances to mix with the outer air, and fortunately so far this carbon monoxide was one of the most poisonous substances known to the chemist. Whenever coal was badly and wastefully burnt, as it was in the production of dense black smoke, the poisonous carbon monoxide was partially unburnt, and escaped up the chimney.

There was another constituent of coal smoke which was in reality evolved in considerable amount when we had regard to the enormous consumption of coal in our large towns—that was the sulphur which existed in the coal smoke as sulphur dioxide, the name given to the pungent choking gas given off from burning limestone. This was due to the presence of the bright brass-like particles, the iron pyrites, which was formed in the course of the decomposition of the woody matter. The amount of iron pyrites in coal of good quality should not exceed 3 per cent., but some coal, like the stinking coal of South Staffordshire, contained it in much

larger quantity, so much, indeed, that they were almost valueless for fuel. On the average a cubic foot of coal smoke contained about half a grain of the sulphur oxide. This was eventually converted into sulphuric acid or oil of vitriol, and was brought down by the rain, and thus effected the corrosion and disintegration of stone and brickwork by dissolving out the lime, magnesia, and alkalies which these materials contained. The heat we obtained from coal was the result of the chemical combination of the oxygen of the air with the carbon and hydrogen of the fuel. The amount of heat generated by a known amount of hydrogen or of carbon burning in the air was a fixed and definite quantity, so that if we knew the chemical composition of coal we could calculate the amount of heat it was theoretically capable of yielding. When coal was heated in close vessels, so that air could not act upon the products, at a high temperature, the result was very different to that obtained in the open fire. The coal evolved a number of substances, liquids, solids, and gases, and yielded a residue of coke relatively richer in carbon than the original coal. The Professor then alluded to the distillation of coal and the making of gas, and proceeded to remark that the cause of the luminosity of coal gas flame had given rise to a great deal of discussion. Even during the last few years Sir HUMPHRY DAVY was of opinion that it was entirely due to the presence of solid incandescent carbon in the flame, and this hypothesis was generally accepted until a number of observations by Dr. FRANKLAND rendered it not improbable that other causes were concerned in the phenomenon. But recent researches, more particularly those of Dr. HEUMANN, had, however, rendered it almost certain that DAVY'S theory was in the main correct, and that solid incandescent carbon was a *vera causa* of the luminosity of coal gas flames and of hydro-carbon flames generally. The by-products obtained in the manufacture of coal gas—the tar and the ammonia water—were now scarcely less important than the gas itself. The ammonia water furnished large quantities of ammoniacal salts, to be used, among other applications, as food for plants, thus restoring to the vegetation of to-day the nitrogen which existed in the plants of primeval times. The tar was a marvellous product, by reason of the scores of beautiful substances which were concealed within it. When distilled it yielded three main products—naptha, dead oil, and pitch, or asphalte. The naptha, on re-distillation, yielded benzoline, from which were prepared some of our most beautiful dyes. The dead oil gave us carbolic acid, used as a disinfectant and antiseptic, together with anthrocine and naphthaline, all three substances the starting point of a new series of colouring matters. In 1825 FARADAY discovered benzoline amongst the liquid products obtained by compressing oil gas, and thereby laid the foundation of the great coal tar industry, which includes the aniline dyes. The paraffin industry, intimately connected with coal tar, mainly owed its origin to Mr. JAMES YOUNG, who in 1848 worked a small petroleum spring near Alfreton, in Derbyshire, and after many trials lighted on the now famous Boghead cannel. In Scotland now about 800,000 tons of shale were distilled annually, producing nearly 30,000,000 gallons of crude oil, from which about 12,000,000 gallons of refined oil were obtained, in addition to large quantities of naptha, solid paraffin, and ammonia, and other chemical products. Years ago the great chemist LIEBIG said that it would certainly be considered one of the greatest discoveries of the age if anyone could succeed in condensing coal gas into a white, dry, solid, odourless substance, portable, and capable of being put on to a candlestick and burned in a lamp. Now paraffin was turned out by the ton to be manufactured into candles, some of which were delicately tinted with colours, all obtained from coal tar. And in this solid paraffin, which, chemically speaking, was the omega of a series of bodies of which marsh gas was the alpha, we saw the accomplishment of the important discovery alluded to by LIEBIG, the value of which could not be estimated.

TELL-TALE FOR STEAM GAUGES.

An apparatus which may be used as a pressure-indicator and tell-tale, or as a pressure test for ascertaining and correcting inaccuracies in steam gauges, has been invented by Mr. ELLIS MARSDEN, of Liverpool, who uses a suitable cock on which he forms (by prolonging one of its branches or ways, and countersinking and enlarging at its end the orifice or way of such branch, and bevelling the periphery thereof) a sensitive valve seat suitably ground or faced. On the outside of and embracing the branch he screws a valve box or barrel provided with a diaphragm, dividing the box into two distinct parts, the part nearest the cock containing the valve, and the upper part being used to apply or contain a lever, spring, or other controlling mechanism. The lower portion or valve chamber is provided with a small whistle, screwed or otherwise attached to the outside of the valve chamber, and communicating therewith. The valve is formed in a piece with the valve spindle, which passes through the diaphragm, and through the cover, which serve as guides. The valve is by preference a disc-face valve of sawcer construction, with its rim bearing on the rim of the valve seat, forming therewith an extremely sensitive arrangement. Above the diaphragm the valve spindle is provided with loose washers, bearing on a shoulder formed by turning down or reducing the upper portion of the spindle, which passes through an oval slot in a controlling lever, and thence through the cover, and is then provided with a milled thumb and finger nut, attached by means of a pin passing through an oval slot in the spindle, and used for hand-turning the valve on its seat.

The controlling lever is by preference a weighted lever of the second kind, which bears upon the loose washer on the spindle, and has its fulcrum on the valve-box or barrel. The lever is graded with great precision and nicety, so that the weight may be set for the valve to blow off at any desired pressure. The cock is by preference provided with a safety key, which can be removed. The whole apparatus may be encased or contained in a suitable box with a glazed or wire front, having outlets or apertures in the cover of the box. The instrument is by preference applied to the steam gauge pipe, and is so set as to act as a test instrument in proximity to the steam gauge, or as a tell-tale. The instrument may also be applied away from the steam gauge in the engineers' room or other place, where it serves as an alarm in the case of excessive pressures.

HOLLOWAY'S PILLS.—The stomach and its troubles cause more discomfort and bring more unhappiness than is commonly supposed. The thousand ills that settle there may be prevented or dislodged by the judicious use of these purifying pills, which act as a sure, gentle anti-acid aperient, without annoying the nerves of the most susceptible or irritating the most delicate organisation. Holloway's pills will bestow comfort and confer relief on every headachy, dyspeptic, and sick'y sufferer, whose tortures make him a burden to himself and a bugbear to his friends. These pills have long been the popular remedy for a weak stomach, for a disordered liver, or a paralysed digestion, which yield without difficulty to the regulating, purifying, and tonic qualities.

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CAPTAIN ABSALOM FRANCIS,
MINING ENGINEER,
GOGINAN, R.S.O., ABERYSTWITH, CARDIGANSHIRE.

Goginan, April 3.—The present time offers an opportunity for capitalists such as, in my opinion, that is not likely to occur again for very many a long year. To those who have acted on my advice since the commencement of the present year a rise has occurred in prices of shares equal to fully 60 per cent., and to those inclined to invest there are really probabilities that every £1 now placed will realise ten times the amount before this year closes. ABSALOM FRANCIS.

PONTYPOOL FIRE-BRICK AND COAL COMPANY (LIMITED),
CWMFFRWDOER, PONTYPOOL.
IMPORTANT SALE OF FIRE BRICK WORKS AND COLLIERY.

MESSRS. W. GRAHAM AND SON are instructed by the Liquidators of the above company TO SELL, BY AUCTION, at the King's Head Hotel, Newport, Monmouthshire, on Tuesday, the 22nd of April, 1879, at Two for Three o'clock in the afternoon (subject to the conditions of sale to be then produced), all those
FIRST-CLASS AND SUBSTANTIALLY ERECTED FIRE-BRICK WORKS,
Together with the
HOUSE COAL COLLIERY AND FIRE CLAY LEVEL
THERETO BELONGING,
Situate at Cwmffrwdoer, near Pontypool, in the county of Monmouth, and comprising about THIRTY ACRES (more or less), and recently carried on by and belonging to the Pontypool Fire-brick and Coal Company (Limited).
The premises are held under leases, which include all the Minerals lying above the Rock Vein Coal, as to part thereof, for an unexpired term of 53 years, granted, or covenanted to be granted, at low royalties, and subject to the minimum mineral rent of £30 per year and of £3 per acre for the user of surface land therein referred to; and as to the other part thereof, including the surface, for an unexpired term of 95 years, at low royalties, and subject to the apportioned minimum rent of £21 1s. 10d. per annum.
The works are very favourably situated for the purpose of carrying on a large and extensive business, being surrounded by important Iron Manufactories and Tin-Plate Works.
THE SALE WILL BE WITHOUT RESERVE.
Further particulars may be obtained upon application to Messrs. GANE and JACKSON, Coleman-street, London, or Newport, Mon.; Messrs. JEE and DANIEL, Mining Engineers, Market House Chambers, Pontypool; to the Auctioneers, Victoria Chambers, Newport, Mon.; or to Messrs. GREENWAY and BYTHWAY, Solicitors, Pontypool.

NORTH DUNRAVEN COLLIERY, GLAMORGANSHIRE,
With the FARM LANDS, FIXED PLANT, MACHINERY, TRAMWAYS, &c., now at work. With possession.

MESSRS. FULLER, HORSEY, SONS, AND CO. are instructed to SELL, BY AUCTION, at the Mart, Tokenhouse-yard, London, on Thursday, April 24th, 1879, at Two o'clock precisely, in One Lot,
THE NORTH DUNRAVEN COLLIERY,
Comprising the Troad Rheu Rees Tiron and Blaen Rhondda Farms, of 852 acres, with the MINES and MINERALS thereunder, held from Lord Dunraven, for fifty-three years, on favourable terms.
The property is situate near Treherbert, a station on the Rhondda branch of the Taff Vale Railway, a branch line from Treherbert running on to the colliery with sidings to the screens, affording communication with the shipping ports of Cardiff and Newport or Swansea. The minerals comprise the well-known seams of coal underlying the Rhondda Valley, the four principal seams being known as the Two Feet Nine Inch, the Four Feet, the Six Feet, and the Nine Feet. The two upper seams are now being worked, and the downcast pit has been sunk 400 yards to the Nine Feet Seam, while the upcast shaft has been sunk 350 yards to the Six Feet Seam. The mine is perfectly ventilated. The downcast shaft is oval-form, 18 ft. by 11 ft. 6 in.; the upcast shaft is circular, 12 ft. diameter.
There are three lines of tramways from the pit's mouths to the screens, passing under cover over the weighing machine to the screens, which are on the railway siding. The downcast shaft is worked by a very fine pair of horizontal steam-engines, 30 inch cylinder, 5 feet stroke, with drum 12 ft. 10 in. diameter, capable of raising 1000 to 1200 tons of coal per day; the upcast shaft by a single engine 25 in. cylinder, five large steam boilers, pumping apparatus, with a quick plunger pump; fire-brick works, with two pairs of crushing rolls, two mills, and three kilns; very complete underground workings, with ventilating shaft and furnace.
The buildings are most substantially erected, of stone principally, with slated roofs, and comprise offices, two winding engine-houses, boiler-house, smithy, carpenters' shops and stores, and granary over. Good farm house, with outbuildings, and 47 wooden cottages.
The coals are economically worked and raised, and the actual cost of working and raising the coal, including royalties and all charges, is ascertained by a system so accurate and so strictly carried out, that the result may be relied on with certainty.
The works may be inspected by application to S. W. KELLY, Esq., Cardiff, of whom particulars may be had.
Particulars may also be had at the Royal Hotel, Cardiff; at the West Gate Hotel, Newport; of Messrs. FLUX and Co., Solicitors, 3, East India Avenue, Leadenhall-street, London, E.C.; at the Auction Mart; and of Messrs. FULLER, HORSEY, SONS, and Co., 11, Billiter-square, London, E.C.

DEVON AND CORNWALL RAILWAY, EXTENSION TO HOLSWORTHY.
IMPORTANT THREE DAYS' SALE OF
CONTRACTORS' PLANT AND MACHINERY.
PRELIMINARY ANNOUNCEMENT.

MR. RYMILL has received instructions from Mr. R. T. RELF, the contractor, to SELL, BY AUCTION, at Okehampton, Halwill, and Holsworthy, early in May, the WHOLE of the
VALUABLE LOCOMOTIVES, PORTABLE ENGINES, and other MACHINERY,
TWO HUNDRED TONS OF CONTRACTORS' RAILS.
TWO HUNDRED TIP WAGONS,
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T. RICHARDS, Esq., F.G.S., Bond-street, Redruth, inspected the property on Oct. 4th, 1876, and his report, with any further information required, can be had by applying to J. STRAUGHTON, Main-street, Cockermouth, Cumberland.

FOR SALE,—A HALF-SHARE in a VALUABLE LEAD MINE, full particulars of which will be forwarded on application by letter, addressed "Miner," MINING JOURNAL Office, 26, Fleet-street, London, E.C.

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NOTICE IS HEREBY GIVEN, that in the Cause of the BRITISH DYNAMITE COMPANY (LIMITED) and NOBEL'S EXPLOSIVES COMPANY (LIMITED), *versus* FRANCIS KREBS and others, that the Right Honourable the House of Lords have, upon the appeal of the plaintiff companies, reversed the decision of the Court of Appeal below, and upheld the judgment of Mr. Justice FRY, given upon the 15th of June, 1877, whereby he awarded to the plaintiff companies an injunction to restrain the defendant, FRANCIS KREBS and others, during such time as certain Letters Patent of the 7th of May, 1867, should remain in force, from Manufacturing or Selling in this country any Lithofracteur or any compound consisting of or containing Nitroglycerine absorbed into any porous unexplosive substance.
Notice is hereby further given, that any person infringing such Patent, or in any way Importing, Purchasing, Selling, Dealing in or Using any Lithofracteur or any other compound consisting of or containing Nitroglycerine absorbed into any porous unexplosive substance will, immediately upon such fact coming to the knowledge of the plaintiff companies or their agents, be proceeded against, and such relief sought as the said companies may be advised.
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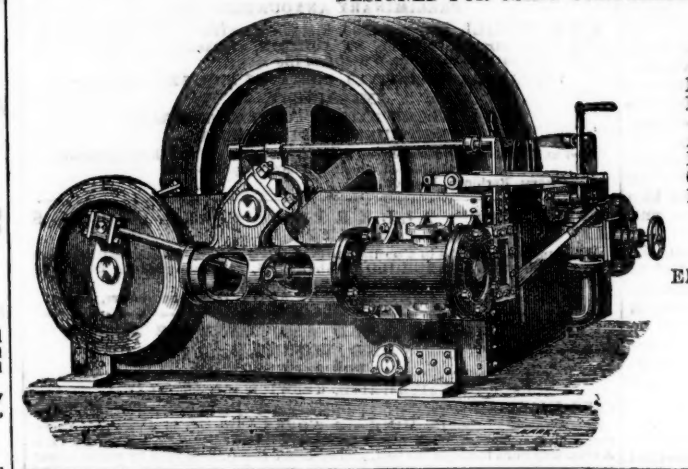

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Ditto Flat Ropes ditto ditto
Ditto Cordage ditto ditto
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THE MINING SHARE LIST.

BRITISH DIVIDEND MINES.

Shares.		Paid.	Last wk.	Clos pr.	Total divs.	Per sh.	Last pd.
2000	Bryn Alyn,* *l*, Denbigh	10 0 0	—		0 7 0	0 7 0	Jan. 1877
10000	Caron, *l*, Cardigan*	2 0 0	2½	2 2½	0 4 0	0 2 0	Oct. 1878
1000	Carn Brea, *c, t*, Illogan†	56 7 6	32	30 32	308 0 0	1 0 0	Feb. 1874
400	Cashwell .. Cumberland*	2 10 0	—		1 9 8	0 2 0	Aug. 1876
2450	Cook's Kitchen, *t*, Illogan†	25 14 9	2½	2⅛ 3	11 17 0	0 7 6	Jan. 1873
240	Devon Gt. Consols, *c*, Tavistock†	1 0 0	2½	2 2½	116 15 0	0 5 0	July 1877
4296	Dolcoath, *c, t*, Camborne	10 14 10	29	27 29	113 1 3	0 5 0	Nov. 1878
5000	East Black Craig *l*, Scotland	5 0 0	—		0 10 0	0 10 0	Feb. 1877
300	East Darren,* *l*, Cardiganshire	32 0 0	—		235 10 0	1 0 0	Aug. 1876
6400	East Pool, *t, c*, Illogan	0 9 0	11¾	10¾ 11¼	15 16 3	0 3 0	Jan. 1879
40000	Glasgow Cara., c* [30,000 £1 p., 10,000 15 p.]		1	⅜ 1	0 13 10	0 0 6	Aug. 1878
8500	Gorsedd & Merllyn Cons., *l*, Flint	2 10 0	2½	2 2¼	0 5 0	0 5 0	Aug. 1877
15000	Great Laxey, *l*, Isle of Man*	4 0 0	17	15½ 16½xd.	24 15 0	0 5 0	Apr. 1879
615	Gt. Retallack, *l, bl*, Perranzabuloe	5 18 8	—		0 1 6	0 1 6	May 1876
6400	Hoon Garth, *l*, Durham*	0 6 0	5	5 5½	2 2 0	0 3 0	Mar. 1878
20000	Grogwinion, *l*, Cardigan*	2 0 0	3	3 3½	0 14 10	0 0 10	Aug. 1878
9880	Gunnislake (Clitters), *t, c*	5 5 0	1¾	1¼ 1¾	0 13 9	0 1 0	Oct. 1876
60000	Holmbush, *a, c, s-l*, Callington*	1 0 0	—		0 4 6	0 0 6	Sept. 1876
2800	Isle of Man, *l*, Isle of Man*†	25 0 0	—		82 5 0	0 0 0	Feb. 1879
20000	Leadhills,* *l*, Lanarkshire	6 0 0	2½	2¼ 2¾	0 15 0	0 3 0	Mar. 1878
400	Lisburne,* *l*, Cardiganshire	18 15 0	35	30 35	197 10 0	1 0 0	Mar. 1879
14000	Llanidloes, *l*, Montgomery	3 0 0	—		0 9 0	0 4 6	Nov. 1876
9000	Marke Valley, *c*, Linkinhorne	5 3 6	⅛	⅛ ¼	7 18 0	0 2 0	Jan. 1876
10000	Mellanear Copper, Hayle*	2 0 0	3½	3½ 3¾	0 8 0	0 3 0	Feb. 1879
8000	Minera Mining Co., *l*, Wrexham*	5 0 0	9	9 11	67 17 8	0 2 0	Nov. 1878
40000	Mining Co. of Ireland, *c, s, l**	7 0 0	—		28 17 6	0 2 6	Jan. 1878
1024	North Busy, *c*, Chacewater	1 14 0	—		1 0 0	0 5 0	Oct. 1878
1289	North Hendre, *l*, Wales	2 10 0	—	6 6¼	2 12 6	0 5 0	Apr. 1879
300000	Panty Mwyn,* *l*, Mold (8794 lss.)	2 0 0	—		0 3 0	0 2 0	Aug 1878
6000	Pedn-an-drea Con., *t*, Redruth	0 8 6	—		0 9 0	0 9 0	June 1877
5000	Penhalls, *t*, St. Agnes	3 17 6	1¾	1¼ 1¾	3 13 6	0 2 0	July 1878
6000	Pennant, *l, bar*, North Wales*	5 0 0	4½	4 4½	0 10 0	0 5 0	Mar. 1878
45793	Penstruthal,* *t, c*, Gwennap	2 0 0	3s.	⅛	0 2 8	0 0 8	Nov. 1878
18000	Prince Patrick,* *s-l*, Holywell	1 0 0	1	¾ 1	0 14 0	0 1 3	Jan. 1876
12000	Ditto, pref. (8000 issued)	0 10 0	—		—	—	—
10000	Red Rock,* *l*, Cardigan	2 0 0	2¼	1¾ 2¼	0 4 0	0 2 0	Jan. 1878
12000	Roman Gravels, *l*, Salop*	7 10 0	8¾	8¾ 9	7 15 0	0 5 0	Mar. 1878
512	South Caradon, *c*, St. Cleer	1 5 0	60	50 55	744 10 0	1 0 0	Nov. 1878
6123	South Condurrow, *t, c*, Camborne	6 5 6	12½	11½ 12	4 17 0	0 16 0	Jan. 1879
12000	St. Harmon,* *l*, Montgom	3 0 0	1	⅛ 1	0 12 0	0 3 0	July 1878
10000	St. Pr. Patrick,* *s-l*, (8000 sh. issued)	1 0 0	—		0 7 0	0 1 0	Oct. 1875
4500	South Wh. Frances, *t*, Illogan†	7 12 4	10½	10 10½	37 12 0	0 7 0	Jan. 1879
12000	Tankerville, *l*, Salop*	6 0 0	3¾	3½ 3¾	4 17 0	0 5 0	Dec. 1876
6000	Tincroft, *c, t*, Pool, Illogan†§	11 10 0	11	10½ 11	50 8 6	0 5 0	May 1877
18000	Van, *l*, Llanidloes*	4 5 0	21	20 21	23 10 6	0 5 0	Jan. 1879
8000	W. Chiverton, *l*, Perranzabuloe†	15 15 0	1⅜	2¾ 3	55 10 0	0 10 0	Feb. 1878
1783	West Poldice, St. Day§	11 0 0	—		1 19 0	0 4 0	July 1876
512	West Tolgus, *c*, Redruth	95 10 0	31	26 28	33 0 0	1 0 0	Jan. 1879
2048	West Wheal Frances, *t*, Illogan§	29 1 3	5½	5 5¼	3 12 6	0 5 0	Oct. 1872
600	West Wh. Seton, *c*, Camborne†	49 0 0	6	4 6	446 0 0	0 15 0	Apr. 1878
12000	West WyeValley,* *l*, Montgom	3 0 0	2	1¼ 1¾	0 12 0	0 3 0	Nov. 1877
1024	Wh. Eliza Consols *t*, St. Austell	18 0 0	—		19 10 0	1 10 0	Aug. 1878
2048	Wheal Jane, *t*, Ker§	5 13 10	1¾	¾ ⅞	8 5 0	0 5 0	July 1875
4295	Wheal Kitty, *t*, St. Agnes	5 4 6	1¾	1 1¼	11 19 6	0 2 6	Dec. 1874
25300	Wh. Newton, *a, c, s, t*, Calstock*	1 0 0	—		0 8 6	0 4 0	Sept. 1877
80	Wheal Owles, *t*, St. Just§	173 15 0	—		522 10 0	4 0 0	Aug. 1872
3000	Wheal Peevor, *t*, Redruth	7 11 0	9¼	9¼ 9¾	1 2 6	0 7 6	Mar. 1879
6000	Wheal Prussia, *t*, Redruth	0 5 0	—		0 4 0	0 1 0	July 1877
10000	Wye Valley, *l*, Montgomery*	3 0 0	2	1¼ 1¾	0 10 6	0 4 6	Oct. 1876

FOREIGN DIVIDEND MINES.

35500	Alamillos, *l*, Spain*†	2 0 0	1⅝	1 1⅝	1 19 9	0 0 6	Oct. 1878
30000	Almada and Tirito Consol., *c*†	1 0 0	¾	⅛ ¾	0 6 3	0 1 0	May 1876
20000	Australian, *c*, South Australia†	7 7 6	1⅜	1¼ 1¾	1 1 6	0 2 0	July 1878
10000	Battle Mountain,* *c*, (6240 part pd.)	5 0 0	—		0 10 0	0 10 0	Nov. 1872
15000	Birdseye Creek, *g*, California*	4 0 0	⅜	⅜ ⅝	0 14 0	0 2 6	June 1874
20000	Cape Copper Mining,*† So. Africa	7 0 0	28	24 28	33 2 6	0 17 6	Dec. 1878
34433	Cedar Creek, *g*, California*	5 0 0	⅜	⅛ ⅜	0 5 0	0 2 6	June 1873
85000	Cesena Sul. Co., Romanga, Italy*	10 0 0	—		0 18 0	0 2 0	Aug. 1878
15000	Chicago, *s*, Utah*	10 0 0	⅜	¼ ⅜	2 8 0	0 4 0	Nov. 1876
65000	Colorado United, *s-l*, Colorado*†	5 0 0	2⅛	1⅞ 2⅛	0 13 6	0 4 0	Jan. 1875
10000	Copiapo, *c*, Chili* (£20 shares)	16 15 0	—		7 11 5	0 3 0	May 1877
100000	Don Pedro North del Rey*†	0 18 0	⅞	¾ ⅞	2 5 9	0 2 0	Mar. 1872
23500	Eberhardt & Aurora, *s*, Nevada*†	10 0 0	5	4½ 5	1 8 0	0 3 0	Dec. 1877
70000	English & Australian, *c*† S. Aust.	2 10 0	1⅜	1½ 1⅝	2 16 9	0 1 0	Mar. 1878
30000	Flagstaff, *s*, Utah*	10 0 0	¾	⅛ ¾	4 2 0	0 5 0	July 1873
25000	Fortuna, *l*, Spain*†	2 0 0	4xd	3½ 4xd	7 4 11	0 1 9	Apr. 1879
85000	Frontino & Bolivia, *g*, New Gran.*†	2 0 0	2⅜	2¼ 2⅜	0 2 6	0 1 6	Sept. 1878
30000	Gold Run, *hyd.*	1 0 0	—		0 2 4	0 0 4	Oct. 1872
100000	Hercules and Roe, *s*, Colo., fy. pd.	2 0 0	—		2 8 0	2 8 0	Jan. 1876
68000	Kapunda Mining Co. Australia†	1 3 0	—		0 2 4	0 0 6	June 1873
20000	Last Chance, *s*,* Utah	5 0 0	⅝	⅜ ⅝	0 14 0	0 2 0	July 1873
15000	Linares, *l*, Spain*†	3 0 0	4¼xd	3¾ 4¼xd	17 12 10	0 2 6	Apr. 1879
65000	London and California, *g*††	2 0 0	⅝	⅜ ⅝	0 1 0	0 1 0	July 1878
7837	Lusitanian, Portugal*† (£5 sh.)	3 10 0	—		1 11 6	0 1 6	Mar. 1873
5000	Mamm Copperopolis of Utah, *c*, s	10 0 0	—		0 5 0	0 5 0	Dec. 1872
5000	Mountain Chief, *s*, Utah*	10 0 0	—		0 4 0	0 4 0	Jan. 1873
10000	Pontgibaud, *s-l*, France†	20 0 0	21	20 21	26 19 8	0 19 9	Dec. 1878
100000	Port Phillip, *g*, Clunes*† (£2 sh.)	1 0 0	⅝	⅛ ⅝	1 12 0	0 1 0	Mar. 1879
54000	Richmond Consols, *s*, Nevada*†	5 0 0	8⅛	8⅛ 8⅞	7 1 6	0 10 0	Feb. 1879
40000	Santa Barbara,* *g*, Brazil	0 10 0	2¾	2⅛ 2⅜	0 5 9	0 1 0	Nov. 1878
120000	Scottish Australian Mining Co.*†	1 0 0	1⅞	1½ 1⅞	15 per cent.		Nov. 1878
80000	Scottish Austral. Mining Co., New	0 10 0	⅞	¾ ⅞	15 per cent.		Nov. 1878
122500	Sierra Buttes, *g*, California*†	2 0 0	2¾	2 2¼	1 19 0	0 1 0	Oct. 1878
140625	S. B. Plumas Eureka	2 0 0	3⅛	2⅞ 3¼	2 1 0	0 3 0	Oct. 1878
£353000	St. John del Rey*† (£5 stock & multiples dealt in)		265	275	¾ year. 15 p. ct. for Dec.		1878
20000	Tolima, *g, s** So. America	5 0 0	—		0 11 6	0 6 6	May 1874
25000	Victoria (London)*, *g*, Australia	1 0 0	⅜	¾ ⅜	0 12 6	0 0 7½	Jan. 1878
18000	Western Andes, *s*,* New Granada	5 0 0	—		0 12 0	0 12 0	July 1876
21000	W. Prussian (5500 pref. sh. 10*l*. pd)	10 0 0	10⅜	10 10½	1 10 0	0 4 0	Jan. 1879

NON-DIVIDEND FOREIGN MINES.

Shares	Mines.	Paid.	Last Pr.	Clos. Pr.	Last Call.
2000	Argentine, *g*, Argentine Republic	5 0 0	⅛	¼ ⅛	Fully pd
80000	Blue Tent, *hyd.*, California	5 0 0	2½	2 2½	Fully pd
15000	Buena Ventura,* *l*, Llano de las Infantas, Spain (£2 sh.)	0 10 0	—		Mar. 1879
15000	Canada,* *g*, Canada	1 0 0	1⅜	1⅛ 1⅜	Fully pd.
49935	Chontales, *g, s*, Nicaragua*†	2 0 0	⅜	⅜ ⅝	Fully pd.
75000	Colombian Hydraulic, *g*, Colombia	1 0 0	—		Fully pd.
16000	Coudes of Chili, *s-l*	5 0 0	—		Fully pd.
20000	English Australian, *g*, Victoria*	1 0 0	⅜	⅛ ¼	Fully pd.
85300	Excelsior Hydraulic Gold Washing Co., California*	5 0 0	—		Dec. 1871
100000	Exchequer, *g, s*, California*†	1 0 0	4s.	2s. 4s.	Fully pd
100000	Frontenac,* *l*, Ontario Canada	1 0 0	—		Fully pd.
40000	Holcombe Valley, *g*,* California	1 0 0	—		Fully pd.
8000	Hornachos,* *s-l*, Spain	10 0 0	—		Fully pd.
12000	Hultafall,* *l, bl*, Orebro, Sweden	5 0 0	3	2 3	Fully pd.
12000	Hunter Consolidated, *s-l*, Utah	10 0 0	—		Fully pd.
20000	Imperial Brazilian Collieries, Brazil*	5 0 0	—		Fully pd.
7500	Isabelle, *g, s**, California (£20 shares)	5 0 0	—		Oct. 1878
100000	I. X. L., *g, s*, California*	1 0 0	¼	⅛ ¼	Fully pd
50000	Javali, *g*, Nicaragua*	2 0 0	⅜	¼	Fully pd
3500	La Manche, *l*, Newfoundland	10 0 0	—		Fully pd.
12000	Lanestosa,* *l, s*, Viscaya, Spain (£2 shares)	1 15 0	—		Mar. 1876
12000	Menzenberg, *c*, Honnef, Germany*	5 5 0	—		Fully pd
4588	New Bensberg, *i, l*, Germany	5 0 0	—		Nov. 1876
66000	New Quebrada, *c*, Venezuela*	5 0 0	—		Fully pd.
20000	New Zealand Kapanga, *g*, Coromandel*	5 0 0	⅞	⅞ ⅞	Fully pd.
3000	Oregon,* *g*, Oregon, U.S. (preference shares	4 0 0	—		Fully pd.
50000	Panuicillo, *c*, Chili*† (£80000 debentures	4 0 0	1¼	¾ 1¼	Fully pd.
90000	Pestarena United, *g*, Italy*†	3 0 0	4s.	2s. 4s.	Fully pd.
25000	Pitanqui,* *g*, Brazil (incl. 6000 sh. £1 fully paid)	0 5 0	—		Aug. 1878
25000	Placerville,* *g g*, California	2 0 0	2¼	2½ 2¾	Fully pd.
50000	Providencia and New Rosario, *s*, Mexico*	1 0 0	—		Fully pd.
40000	Ravenscliff, *g*, New Zealand; *c*, South Australia	0 5 0	¼	¼	July 1878
£2,151,000	Rio Tinto,* *c*, Huelva, Spain	Stock	62	60 62	Fully pd.
100000	Rossa Grande, *g*, Brazil*† (£1 shares)	1 0 0	3s.	1s. 3s.	Fully pd.
30040	Russia Copper, Orenburg and Ufa*†	10 0 0	—		Fully pd
320.0	Sentein,* *l*, Ariège, France	1 0 0	—		Fully pd.
10000	Silver Plume, *s*, Colorado*	1 0 0	—		Fully pd.
30000	Tecoma, *s*, Utah*	10 0 0	⅝	⅜ ⅝	Fully pd.
43174	United Mexican, *s*, Mexico*†	29 0 3	3¾	3¼ 3¾	May 1878
14000	Utah, *g, s-i*, Utah*	5 0 0	—		Fully pd
50000	Virneberg, *c* Rheinbreitbach, Germany*	2 0 0	—		Fully pd
15000	Yorke Peninsula, *c*, South Australia	1 0 0	4s.	2s. 4s.	Fully pd.
4800	Yorke Peninsula, *s*, South Australia Preference	1 0 0	⅛	¼ ⅛	Fully pd.

§ Have made calls since last dividend was paid.

FOREIGN AND MISCELLANEOUS STOCKS, BONDS, LOANS, AND TRUSTS.

	Closing Prices	
Argentine, 1868 6 per cent.	69¼	70⅛
Bolivia, 6 per cent.	27⅛	28½
Brazilian, 1865, 5 per cent.	89⅛	90⅛
Chilian, 1866, 7 per cent.	69	74
City of Providence, 6 p.c. coupon bnds	100	102
Egyptian, Gov. preference	67⅞	68½
Do., unified debt, scrip	45¾	46
Do., 7 per cent., V.M.L.	74	78
Do. 9 per cent guar.	76	77
Do., K. Daira Sanieh	52¼	52¾

	Closing Prices.	
Foreign and Col. Gov. Trust, 6 p. ct.	65	70
Do., 5 per cent., 2d issue	50	55
Do., 6 per cent., 3d issue	65	70
Do., 1872, 4th issue	60	64
Do., 1873, 5th issue	60	65
Peruvian, 1870, 6 per cent.	13	13¼
Do., 1872, 5 per cent	10⅞	11⅛
Russian, 5½ per cent. L. Mort.		—
Spanish, Quicksilver Mort., 5 p. ct.	99	101
United States Mort. 6 per cent.	102	104

b, blende; *ci*, coal; *c*, copper; *g*, gold; *l*, lead; *s*, silver; *sl*, slate; *s-i*, silver-lead; *t*, tin; *z*, zinc.

* Limite Liability Companies; † quoted on the Stock Exchange; ‡ have paid dividends.

NON-DIVIDEND MINES.

Shares		Paid.	Last wk.	Clos. pr
40000	Aberdaunant, *l*, Llanidloes*	1 0 0	¼	⅛ ¼
2560	Aberllyn,* *l, bl*, Carnarvon	10 0 0	12	10 12
10000	Aberystwith,* *s-*, Cardigan	5 0 0	—	
80	Albion, *t*, Cornwall	100 0 0	—	
12000	Assheton, *l*, Carnarvonshire*	5 0 0	1	¾ 1
40000	Ballycummisk,* *c*, Schull	2 0 0	—	
12000	Bedford Unit.,* *c*, Tavist. (1*l*. liab.)	0 1 0	⅛	⅛ ⅜
12000	Bell Vean, *t, c*, Gwennap	2 0 0	2	1½ 2
30000	Bettws-y-Coed,* *l* (20,000 issued)	1 0 0	1¼	1 1¼
800	Blaen Caelan,* *l*, Cardigan	3 0 0	—	
3937	Blue Hills, *t, c*, St. Agnes	4 6 6	¾	⅝ ¾
30000	Bodidris,* *l, bl*, Denbighshire	1 0 0	1⅝	1½ 1⅝
1000	Bollihope Vale,* *s-l*, Durham	5 0 0	—	
200	Botallack, *t, c*, St. Just]	123 15 0	17½	15 17½
2000	Bowden Hill,* *ma*	1 0 0	—	
6000	Bradwell Moss Rake	1 0 0	1	⅜ 1
10 00	British,* *s-l*, Wrexham	2 0 0	3	2 3
256	Browngelly, *c*, St. Neot	0 10 0	⅜	⅛ ⅜
50000	Cambrian,* *s-i, c*, Cardiganshire	2 0 0	2¼	2 2¼
20000	Central Foxdale, *i*, I. of Man*(2*l*. sh.)	1 5 0	—	
10000	Central Van,* *l, bl*, Llanidloes	5 0 0	—	
12500	Clementina, *l*, Llanrwst*	1 0 0	1¼	1 1¼
7500	Combellack,* *t*, Wendron	2 0 0	—	
6000	Combmartin, *s-l*, North Devon	0 7 0	⅛	⅛
1400	Crosswood Mining Lands, *l*.*	1 0 0	2	1½ 2
15000	Cwm Brwyno,* *l*, Cardigan	2 0 0	2	2 2⅛
15000	Cwm Dwyfor, *c, s-l*, Wales	1 0 0	—	
5000	Ditto, 12½ per cent. pref	1 0 0	—	
3000	Cwmystwith* (New), *l*, Cardigansh.	5 0 0	—	
1580	D'Eresby Cons., *l, bl*, Carnarvon	10 0 0	8	6 8
1024	D'Eresby Mountain, *l, bl*, Llanrwst	20 0 0	40	30 40
2000	Denbighshire Consolidated, *l**	3 0 0	1½	1 1½
12000	Derwent,* *l*, Durham	4 0 0	¾	½ ¾
10000	Dubby Syke, *l*, Durham*	0 15 0	4s.	4s.
6144	East Caradon, *c, s*, St. Cleer]	3 2 0	⅛	¾ ⅜
4000	East Chiverton, *i*, Perranzabuloe	7 7 6	1¼	1 1¼
3000	East Craven Moor*, *l*, Pateley Edge	10 0 0	10	8 10
800	East Goginan, *l*, Cardigan	2 0 0	—	
30000	East Roman Gravels,* *l*, Salop	1 0 0	—	
18000	East Van, *i*, Llanidloes*	5 0 0	2¼	1¾ 2
1722	East Wh. Lovell, *t*, Helston	9 16 0	⅛	¾ ⅛
20000	Elgar,* *s-l*, Cardiganshire	1 0 0	—	
12500	Frongoch, *l*, Cardigan (11000 issued)	2 0 0	2½	2 2½
10000	Frosterley,* *l*, Durham	1 0 0	—	
3950	Gawton, *c*, Tavistock	4 5 6	⅜	⅛ ⅜
12000	Glan Clwyd,* *i*, Gwyddelwern	1 0 0	—	
14000	Glenroy,* *s-l*, Isle of Man	4 5 0	⅛	⅜ ⅛
10000	Glyn,* *l*, Llanidloes	2 0 0	⅛	⅛ ⅜
12000	Goginan, & Lvl. Newydd, *s-l*, Card.*	2 10 0	—	
20000	Goreu,* *s-i*, Carmarthen	1 0 0	1	¾ 1
20000	Gt. E. Foxdale, *l*, I. of Man (1*l*. sh)	0 18 0	—	
12000	Great Holway,* *l*, Flintshire	5 0 0	5¼	4½ 5
9500	Great Pant-y-Pydew, *l*, Holywell	2 0 0	—	
6000	Gt. Wheal Eleanor, *t*, North Bovey	1 17 6	⅜	¼ ⅜
6000	Great Wheal Rodd,* *s-l*, Cornwall	0 10 0	1	¾ 1
10000	Harehope Gill,* *l*, Durham (£1 sh.)	0 5 0	—	
600	Hartington Moor,* *carb. l*, Derby	1 0 0	2	1½ 2
6400	Harwood,* *l*, Durham	0 15 0	2s.	1s 6d.
3000	Herodsfoot, *i*, near Liskeard†	1 0 0	4	3 4
1000	Hingston Down, *c*, Calstock*†	0 6 0	¼	⅛ ¼
5000	Hush Elateddfod Minera,* *l*	2 0 0	—	
2500	Killaloe, *sl*, Tipperary]	1 0 0	—	
6000	Killifreth, *t*, Chacewater	2 12 6	1⅝	1½ 1⅝
25000	Kingston Con., *s-i*, Stoke Climsland.	1 0 0	—	
	Ditto, preference	1 0 0	1⅜	1 1⅜
12000	Ladywell,* *l*, Salop	2 10 0	¾	⅛ ¾
12000	Ditto, 10 per cent. pref., 1*l*. each	0 10 0	⅜	⅜ ⅝
5000	Lead Era,* *l*, Mold	2 10 0	3¼	2¾ 3¼
2500	Levant, *c, t*, St. Just	10 14 6	—	
6000	Livingstone Consols, *t*, St. Agnes	0 10 0	⅜	⅜ ⅜
10000	Lomax, *s-l*, Perranzabuloe	1 0 0	1¼	1 1¼
5120	Lovell, *t*, Wendron	0 16 0	2	1⅛ 2
25000	Llanrhaiadr, *l*, Montgomery*	2 0 0	—	
30000	Llanrwst,* *l*, Carnarvon	2 0 0	2	1 2
24	Mawston,* *l*, South Wales	50 0 0	2	1⅛ 2
6000	Medlyn Moor, *t*, Wendron	2 9 10	—	
11000	Melyndw .. *l*, Cardigan*	2 0 0	1¾	¾ 1¼
7000	Mid Devon Copper*	0 6 8	1¼	1 1¼
21000	Ditto	0 2 6	1	¾ 1
8000	Mineral Corp. of Great Britain*	10 0 0	11	10 11
11000	Monydd Gorddu, *i*, Cardigan*(Red.)	5 0 0	2¾	2½ 2¾
12000	Morfa Du, *z, g, s*, Anglesea*	1 0 0	1	⅞ 1
25000	Nant-y-Ronen, *s-i*, Cardigan*	1 0 0	—	
15000	Nascent Copper*	1 0 0	—	
4768	New Bronfloyd,* ., Cardigan (5*l*. sh.)	3 16 0	3	2¾ 3
8000	New Dolcoath, *t, c*, Camborne*	8 0 0	1¾	1½ 1¾
20000	New East Foxdale, *s-l*, Isle of Man.	0 18 0	—	
1492	New Hendra, *t*, Breage	3 9 0	—	
3500	New Tincroft,* *t*, Lelant	6 0 0	3	2½ 3
4000	North Cornwall,* *l*, Cornwall	5 0 0	5	5
30000	North Laxey,* Isle of Man	1 0 0	4s.	2s. 4s.
2000	North Levant, *t, c*, St. Just]	12 16 0	1	¾ 1
80000	North Molton, *c, mn, i*, Devon	1 0 0	1	1
5936	North Treskerby, *c*, St. Agnes	8 17 10	—	
6400	Oola Hills,* *s-l*, Limerick	5 0 0	—	
12000	Pandora,* *l*, Carnarvon	2 0 0	⅛	⅜ ⅛
6000	Park Valley,* *s-l*, North Devon	0 4 0	¾	⅛ ¾
6000	Parracombe, *s l*, Devon	0 5 0	⅛	⅛
16928	Parys Mountain,* *c*, Anglesea	3 0 0	⅜	⅛ ⅜
12000	Phœnix, & W. Phœnix, *t, c*, Link.§	5 10 3	—	
4000	Pateley Bridge, *l*, Yorkshire	5 0 0	1¾	⅜ 1⅜
7000	Picton,* *s-l*, Holywell, fully paid	1 0 0	1	¾ 1
12000	Plynlimmon, *i*, Llanidloes*	2 0 0	6s.	4s. 6s.
10000	Port Nigel,* *s-i*, Carnarvonshire	2 0 0	⅛	¼ ⅛
2000	Prideaux Wood, *t*, Llanivery	5 0 0	—	
5182	Prince of Wales, *c*, Calstock]	2 8 0	6d.	6d.
6000	Relistian Consols, *c*, Gwinear	0 10 0	¾	⅛ ¾
5000	Rhydalun,* *l*, Mold	10 0 0	11	10 11
15000	Rookhope, *i*, Durham*	1 10 0	¾	⅛ ¾
4200	Snowbrook, *s-l*, Montgomery	5 0 0	—	
900	So. Cwmystwith, *i*, Cardiganshire	2 0 0	3	2 3
2000	South Darren, *l*, Cardigan*	1 10 0	1¾	1½ 1¾
30000	South de Eresby Mountain,	1 0 0	1⅛	1¼ 1⅛
6000	So. Devon United Copper*	1 0 0	1	¾ 1
512	South Dolcoath, *c, t*, Redruth	12 5 0	—	
5000	So. Molton Cons., *s-l*, No. Devon	0 3 6	—	
18000	South Roman Gravels, *l**	1 10 0	3s.	1s. 3s.
6000	South Roskear, *t, c*, Camborne	8 5 0	—	
6000	South Tolcarne, *t, c*, Camborne	2 5 6	¾	⅛ ¾
937	South Wheal Crofty, *c*, Illogan	45 10 10	7½	7 7½
12000	Steddfa,* *l*, Cardigan	1 0 0	1¼	1 1¼
6000	St. Lawrence, Anmal., *l*, Flintshire*	2 0 0	—	
10000	St. Patrick, *i*, Halkin, Holywell*	1 0 0	1¼	1 1¼
8000	Success, &c., *i*, Derb. (12,000*l*. called)	1 0 0	—	
16000	Sunnyside,* *l*, Durham	2 0 0	—	
30000	Talybont,* *s-l*, Cardiganshire	1 0 0	—	
40000	Tamar, *s-l*, Bearalston*	1 0 0	1⅜	1⅛ 1⅜
6400	Teesdale,* *i*, Durham	1 0 0	⅞	1
14000	Teign Valley, *i, bar*., Bridford	1 0 0	—	
10000	Temple, *i*, Cardigan*	1 0 0	—	
10000	Tolgus Consols,* *c*, Redruth	5 0 0	3¼	3 3½
8000	Treleigh Wood, *t*, Redruth	6 1 0	—	
12000	Trethellan, *s-l*, Crantock*	2 0 0	—	
640	Truro*, *l*, Nerquis, Flintshire	10 0 0	—	
5000	Tyn-y-Fron,* *i*, Cardigan	1 0 0	1	¾ 1
5000	Ditto	0 5 0	⅜	⅛ ¼
1000	Vaughan*, *i*., Cardiganshire	10 0 0	—	
18000	Victor,* *l*, Flintshire (£1 share)	0 5 0	—	
12000	West Assheton, *i*, Carnarvon	1 0 0	1	1⅛ 1⅜
6000	West Basset, *c